United States
Department of
Agriculture

Natural
Resources
Conservation
Service

In cooperation with
the University of Florida,
Institute of Food and
Agricultural Sciences,
Agricultural Experiment
Stations, and Soil
Science Department; and
the Florida Department of
Agriculture and Consumer
Services

Soil Survey of Monroe County, Keys Area, Florida

How to Use This Soil Survey

The **detailed soil maps** are at the back of this survey. These maps can be useful in planning the use and management of small areas. To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet. Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see "Contents"), which lists the map units by symbol and name and shows the page where each map unit is described. The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1988. Soil names and descriptions were approved in 1989. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1990. This soil survey was made cooperatively by the Natural Resources Conservation Service; the University of Florida, Institute of Food and Agricultural Sciences, Agricultural Experiment Stations, and Soil Science Department; and the Florida Department of Agriculture and Consumer Services.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Natural Resources Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: An area of the Udorthents-Urban land complex used for building site development.

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Issued October 1995

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Foreword

This soil survey contains information that can be used in land-planning programs in the survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

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Soil Survey of Monroe County, Keys Area, Florida

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United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with
the University of Florida, Institute of Food and Agricultural Sciences, Agricultural Experiment Stations, and Soil Science Department; and the Florida Department of Agriculture and Consumer Services

The survey area is the southernmost part of Florida and the United States (fig. 1). It has a population of about 80,000 *(13)*. Key West is the southernmost city and is the county seat. The total area of Monroe County is about 926,800 acres. The survey area is about 66,000 acres in size. It consists of nonfederally leased or controlled land and federally owned land.

The survey area consists of a series of small islands surrounded by the Gulf of Mexico and the Atlantic Ocean. Key Largo is the northernmost and easternmost island and Key West is the southernmost and westernmost island. The distance from Key Largo to Key West is about 110 miles.

The keys are underlain by coral limestone bedrock in the north and east and by oolitic limestone bedrock in the south and west. The bedrock is near the surface in all areas except for some areas of mangrove swamps. The highest elevation in the keys is about 16 feet above sea level, according to National Geodetic Vertical Datum of 1929 *(7)*. The lowest elevation is below sea level.

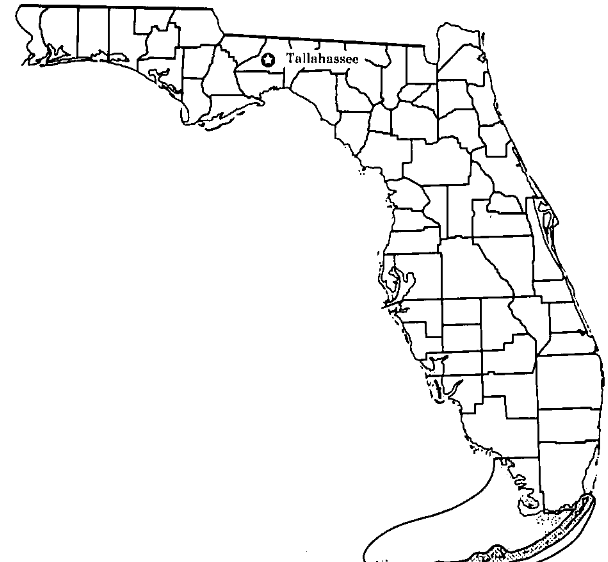

Figure 1.—Location of Monroe County, keys area, in Florida.

General Nature of the Survey Area

This section gives general information about the survey area. It describes farming, history, geology, and climate.

Farming

Records indicate that bananas, citrus crops, and vegetable crops were once grown in the survey area *(15)*. After the completion of U.S. Highway 1 and the hurricane of 1935, however, the economic production of crops ceased. Currently, no agricultural land is in the survey area *(13)*.

History

The Caloosa Indians were the first inhabitants of the keys *(15)*. Plantation Key was inhabited by the Caloosa Indians centuries ago. A large midden of Caloosa origin has been found on the bay in the northern part of Plantation Key. A large Caloosa burial ground is on Lignumvitae Key. The original name for Key West was Cayo Hueso, Spanish for Island of Bones. The bones in this area were of Caloosa origin.

Ponce de Leon came to the keys in 1513 while searching for gold. In the 1600's, the Spanish logged the mahogany trees that grew in the keys *(15)*.

In 1821, Florida became part of the United States. The first settlement was at Cayo Hueso, or Key West, in 1822. Key West was settled by people from the Bahamas and later by people from New England. These people settled at Key West to salvage wrecked ships after Florida had become part of the United States.

In 1842, after the end of the second Seminole war, few Indians were left in the keys. Most were sent to live in Oklahoma. Some moved north to the swamps of the everglades.

The areas in the Florida Keys other than Key West were inhabited by very few people until 1874, when the government surveyed these areas and divided the land for homesteading. During the period 1905-12, a railroad was built from Homestead to Key West. In 1926, less than 500 people were in Key West and only 17 were in Marathon. The people of the keys were mainly farmers, fishermen, and wreckers. Very few changes occurred in the Florida Keys until the completion of U.S. Highway 1 in the 1930's and the completion of an 18-inch water pipe throughout the keys in 1942. The hurricane of 1935 destroyed much of the keys and ended the economic production of crops.

The 18-inch water pipe was replaced by a 36-inch water pipe in 1982. At that time, housing development also increased. About 80,000 people now live in the keys. They are mostly retired people who live in the keys during the winter.

Geology

The survey area consists of two distinct geologic areas. The material in the area south from Key Largo to Upper Matecumbe Key is coral and that in the area south and west from Lower Matecumbe Key is oolite.

The Coral Keys

The coral keys probably were an active coral reef at one time, possibly while they were emerging to form mangrove islands. Currently, the coral keys have a denuded surface, from which the original surface of the coral reef has been completely removed. In the highest parts of the coral keys that are mainly on Key Largo east of where U.S. Highway 1 enters the coral keys from the mainland and on Windley Key, no evidence of resubmergence since the original emergence seems to exist *(14)*. The surface has some considerable local relief and occasionally has the ragged, irregular appearance of microkarst. Also, there are local accumulations of residual soil. All of these features suggest that these higher parts of the coral keys have remained under conditions of subaerial exposure for the greatest part of the 100,000 years since the coral of the reef was formed.

The remaining part of the coral keys has a lower, smoother surface that seems to have resulted from marine denudation. Near the outer and inner edges of the relict coral reef, the surface slopes gently down toward the present shore, where it is being cut back by wave splash in the current cycle of shoreline denudation. This wave splash is forming a new, similar surface directly offshore. The shore zone that is repetitively wet by wave splash has an extremely ragged, irregular surface of bare coral rock that is honeycombed with solution holes. Most of these holes are a few inches to a foot or so wide. They do not vary greatly in depth.

The higher, rougher, soil-covered parts of the coral keys, such as areas in the eastern part of Key Largo and areas near the old quarry on Windley Key, were not cut away by the wave splash that beveled the lower, smoother, flatter parts.

The cresting of a transgression rather than an interval of stability during a regression probably beveled the coral keys. The Key Largo coral reef was probably formed when the sea was at its Pamlico level. The period of time between the regression of the sea from this level to its 10-foot level rise, which beveled most of the high coral keys, was probably much longer than the later timespan since the sea regressed from that 10-foot level and left the lower, smoother parts of the coral keys exposed. This theory is supported by the presence of an appreciable amount of residual soil in some areas and a virtual absence of residual soil from the lower, smoother, wave-beveled parts.

The brown residual soil that is in some areas attests to the transgression that culminated in the 10-foot rise in sea level. Old solution pits filled with this brown soil and fragments of limestone are in the walls of two widely separate cuts in the wave-beveled part of the coral keys. Apparently, these pits were formed by fresh ground water before the sea level rose to the 10-foot level that beveled the surface of the lower, smoother parts of the coral keys.

The Oolite Keys

The boundary between the coral keys and the oolite keys is between Upper Matecumbe Key and Lower Matecumbe Key. The oolite keys extend all the way to the southwest end of the Florida Keys *(3)*. The elevation of the oolite keys is more than half that of the elevation of the coral keys. The eastern part of the oolite keys from Lower Matecumbe Key to Newfound Harbor Key is very similar to the coral keys. The oolite keys are elongated in the same direction as the coral keys and generally are parallel to the coastline. They form the western coastline of the Florida Keys. This western extension of the curving archipelago, however, curves back northward a few miles and forms an abrupt break in the westward trend of the coastline. As a group, the oolite keys occur in an east to west direction, but individually they tend to elongate perpendicular to this direction, usually slightly to the northwest.

The oolite keys probably formed in the same manner as the coral keys. They have the same low, eroded surface as that of the coral keys. The surface is smooth and flat in the center of an island and slopes gently downward near the shore. Like the wave-beveled parts of the coral keys, it has little, if any, residual soil. No solution pits that were made subaerially were observed, but it is possible that these pits could be revealed by a few cuts.

The surface of the oolite keys was probably beveled by a sea level that was 4 or 5 feet higher than the present sea level. Because relict subaerially made features extending below this surface are absent, it is unclear whether the sea rose to this level from a lower stand or dropped to it directly from the higher stand that beveled the lower part of the coral keys.

Climate

The survey area has long, hot, humid summers, which are frequently cooled by sea breezes. It has warm winters, which are occasionally cooled by incursions of air from the north. Rainfall occurs throughout the year. Every few years a hurricane crosses the area.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Key West, Florida, in the period 1951 to 1986.

In winter, the average temperature is 70 degrees F and the average daily minimum temperature is 65 degrees. The lowest temperature on record, which occurred at Key West on January 13, 1981, is 41 degrees. In summer, the average temperature is 84 degrees and the average daily maximum temperature is 89 degrees. The highest recorded temperature, which occurred on July 23, 1951, is 95 degrees.

The total annual precipitation is 40.09 inches. The heaviest 1-day rainfall during the period of record was 22.75 inches at Key West on January 11, 1980. Thunderstorms occur on about 74 days each year.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 75 percent of the time possible in summer and 65 percent in winter. The prevailing wind is from the east-southeast. Average windspeed is highest, 10 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and

other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields roads and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by two or three kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under the heading "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Typical profiles of the soils in this survey area are described in the section "Soil Series and Their Morphology."

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Cudjoe marl, tidal, is a phase of the Cudjoe series.

Some map units are made up of two or more major soils. These map units are called soil complexes. A *soil complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Rock outcrop-Tavernier complex, tidal, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Urban land is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 2 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The "Glossary" defines many of the terms used in describing the soils.

2—Pennekamp gravelly muck, 0 to 2 percent slopes, extremely stony

Geographic Setting

This soil is on tropical hammocks in the uplands of the upper keys. About 10 percent of the surface of this soil is covered with stones that are dominantly 10 to 20 inches in diameter. Individual areas are subject to rare flooding from hurricanes and other tropical storms. Elevations are dominantly 5 to 15 feet above sea level, according to National Geodetic Vertical Datum of 1929. The mean annual temperature is about 78 degrees F, and the mean annual precipitation is about 50 inches.

Map Unit Composition

The Pennekamp soil is dominant in this map unit. Soils in areas on the keys between Upper Matecumbe Key and Big Pine Key are more sandy than the Pennekamp soil; however, uses and interpretations are the same as those of the Pennekamp soil. Areas that have different uses and interpretations are rare and generally are adjacent to the boundaries of the map unit.

Figure 2.—Characteristic vegetation in an area of Pennekamp gravelly muck, 0 to 2 percent slopes, extremely stony.

Geographically Associated Soils

Soils that are associated with the Pennekamp soil are the moderately well drained, organic Matecumbe soils and somewhat poorly drained, marly Saddlebunch soils in the slightly lower positions on the landscape and the poorly drained, marly Cudjoe, Lignumvitae, and Keywest soils and very poorly drained, organic Islamorada, Keylargo, and Tavernier soils in the significantly lower positions on the landscape.

Drainage and Permeability

The Pennekamp soil is well drained. It has a seasonal high water table at a depth of 3.5 to 5.0 feet during the wet periods of most years. Permeability is moderately rapid.

Use and Vegetation

Most areas of this soil support native vegetation and are used as habitat for woodland wildlife (fig. 2). Some areas have been developed for residential, urban, or recreational use. Table 3 lists characteristic vegetation for the soils in the survey area. Because the species listed generally are more easily established and require less maintenance than other species, they should be selected for planting during beautification and landscaping.

Threatened or Endangered Plants and Animals

Threatened or endangered plants and animals in areas of this soil may include the following—

Trees: Thatch palm, buccaneer-palm, Deering's tree cactus
Shrubs: Pride-of-big-pine
Herbaceous plants: Spleenworts, orchids, ferns, twisted air plant
Mammals: Key deer, Key Largo cotton mouse, Key Largo woodrat, Big Cypress fox squirrel
Birds: Bald eagle, white-crowned pigeon, wood stork

Interpretations

Depth to bedrock and the flooding are severe limitations affecting most uses of this soil, including most kinds of building site and recreational development and sanitary facilities. Tables 4, 6, and 7 provide more detailed information about these limitations.

3—Matecumbe muck, occasionally flooded

Geographic Setting

This soil is on tropical hammocks in the uplands throughout the keys. Individual areas are subject to occasional flooding from hurricanes and other tropical storms. Elevations are less than 15 feet above sea level, according to National Geodetic Vertical Datum of 1929. The mean annual temperature ranges from 74 to 78 degrees F, and the mean annual precipitation ranges from 50 to 65 inches.

Map Unit Composition

The Matecumbe soil is dominant in this map unit. Areas that have different uses and interpretations are rare and generally are adjacent to the boundaries of the map unit.

Geographically Associated Soils

Soils that are associated with the Matecumbe soil are the well drained, mineral Keyvaca and Pennekamp soils in the higher positions on the landscape; the somewhat poorly drained, marly Saddlebunch soils in landscape positions similar to those of the Matecumbe soil; and the poorly drained, marly Cudjoe, Keywest, and Lignumvitae soils and very poorly drained, organic Islamorada, Keylargo, and Tavernier soils in the lower positions on the landscape.

Drainage and Permeability

The Matecumbe soil is moderately well drained. It has a seasonal high water table at a depth of 1.5 to 3.0 feet during the wet periods of most years. Permeability is rapid.

Use and Vegetation

Most areas of this soil support native vegetation and are used as habitat for woodland wildlife. Some areas have been developed for residential, urban, or recreational use. Table 3 lists characteristic vegetation for the soils in the survey area. Because the species listed generally are more easily established and require less maintenance than other species, they should be selected for planting during beautification and landscaping.

Threatened or Endangered Plants and Animals

Threatened or endangered plants and animals in areas of this soil may include the following—

Trees: Thatch palm, buccaneer-palm
Shrubs: Pride-of-big-pine
Herbaceous plants: Spleenworts, orchids, ferns, twisted air plant
Mammals: Key deer, Key Largo cotton mouse, Key Largo woodrat, Big Cypress fox squirrel
Birds: Bald eagle, white-crowned pigeon, wood stork

Interpretations

Depth to bedrock, the flooding, and an excessive amount of humus are severe limitations affecting most uses of this soil, including most kinds of building site and recreational development and sanitary facilities. Tables 4, 6, and 7 provide more detailed information about these limitations.

4—Rock outcrop-Tavernier complex, tidal

Geographic Setting

This map unit is in mangrove swamps throughout the keys. Individual areas are subject to daily flooding by tides. Elevations are less than 2 feet above sea level, according to National Geodetic Vertical Datum of 1929. The mean annual temperature is about 75 degrees F, and the mean annual precipitation is about 55 inches.

Map Unit Composition

Approximately 60 percent of this map unit consists of areas of exposed bedrock. These areas are dominantly 1 to 4 inches above the surface of the surrounding soil and range from approximately 2 feet to more than 200 feet in diameter. The Tavernier soil is dominant in about 35 percent of this map unit. Areas that have different uses and interpretations are rare and generally are adjacent to the boundaries of the map unit.

Geographically Associated Soils

Soils that are associated with the Tavernier soil are the very poorly drained, organic Islamorada and

Figure 3.—An area of Rock outcrop-Tavernier complex, tidal. Black mangrove is the dominant vegetative species.

Keylargo soils in landscape positions similar to those of the Tavernier soil; the poorly drained, marly Cudjoe, Lignumvitae, and Keywest soils in the slightly higher positions on the landscape; and the moderately well drained, organic Matecumbe soils and somewhat poorly drained, marly Saddlebunch soils in the significantly higher positions on the landscape.

Drainage and Permeability

The Tavernier soil is very poorly drained. The seasonal high water table is at or near the surface during much of the year. Permeability is rapid.

Use and Vegetation

Most areas of this map unit support native vegetation and are used as habitat for wetland wildlife (fig. 3).

Some areas have been developed for residential, urban, or recreational use. Table 3 lists characteristic vegetation for the soils in the survey area. Because the species listed generally are more easily established and require less maintenance than other species, they should be selected for planting during beautification and landscaping.

Threatened or Endangered Plants and Animals

Threatened or endangered plants and animals in areas of this map unit may include the following—

Birds: Bald eagle, white-crowned pigeon, wood stork
Reptiles: American crocodile

Interpretations

The flooding, the depth to bedrock, and the wetness are severe limitations affecting most uses of this map unit, including most kinds of building site and recreational development and sanitary facilities. Tables 4, 6, and 7 provide more detailed information about these limitations.

5—Islamorada muck, tidal

Geographic Setting

This soil is dominantly on the upper keys in mangrove swamps. Individual areas are subject to daily flooding by tides. Elevations are dominantly at or below sea level, according to National Geodetic Vertical Datum of 1929. The mean annual temperature is about 75 degrees F, and the mean annual precipitation is about 50 inches.

Map Unit Composition

The Islamorada soil is dominant in this map unit. Areas of the Tavernier soils are also included. These soils have bedrock within a depth of 20 inches. Other areas that have different uses and interpretations are rare and generally are adjacent to the boundaries of the map unit.

Geographically Associated Soils

Soils that are associated with the Islamorada soil are the very poorly drained, organic Keylargo and Tavernier soils in landscape positions similar to those of the Islamorada soil; the poorly drained, marly Cudjoe, Lignumvitae, and Keywest soils in the slightly higher positions on the landscape; and the moderately well drained, organic Matecumbe soils and somewhat poorly drained, marly Saddlebunch soils in the significantly higher positions on the landscape.

Drainage and Permeability

The Islamorada soil is very poorly drained. The seasonal high water table is at or near the surface during much of the year. Permeability is rapid.

Use and Vegetation

Most areas of this soil support native vegetation and are used as habitat for wetland wildlife. Some areas have been developed for residential or recreational use. Table 3 lists characteristic vegetation for the soils in the survey area. Because the species listed generally are more easily established and require less maintenance than other species, they should be selected for planting during beautification and landscaping.

Threatened or Endangered Plants and Animals

Threatened or endangered plants and animals in areas of this soil may include the following—

Birds: Bald eagle, white-crowned pigeon, wood stork
Reptiles: American crocodile

Interpretations

The wetness, the flooding, and depth to bedrock are severe limitations affecting most uses of this soil, including most kinds of building site and recreational development and sanitary facilities. Tables 4, 6, and 7 provide more detailed information about these limitations.

6—Keylargo muck, tidal

Geographic Setting

This soil is dominantly on the upper keys but can occur throughout the keys. It is in mangrove swamps (fig. 4). Individual areas are subject to daily flooding by tides. Elevations are dominantly at or below sea level, according to National Geodetic Vertical Datum of 1929. The mean annual temperature is about 75 degrees F, and the mean annual precipitation is about 50 inches.

Map Unit Composition

The Keylargo soil is dominant in this map unit. Areas that have different uses and interpretations are very rare and generally are adjacent to the boundaries of the map unit.

Geographically Associated Soils

Soils that are associated with the Keylargo soil are the very poorly drained, organic Islamorada and Tavernier soils in landscape positions similar to those of the Keylargo soil; the poorly drained, marly Cudjoe, Lignumvitae, and Keywest soils in the slightly higher positions on the landscape; and the moderately well drained, organic Matecumbe soils and somewhat poorly drained, marly Saddlebunch soils in the significantly higher positions on the landscape.

Figure 4.—An area of Keylargo muck, tidal. This map unit is adjacent to open water throughout much of the survey area.

Drainage and Permeability

The Keylargo soil is very poorly drained. The seasonal high water table is at or near the surface during much of the year. Permeability is rapid.

Use and Vegetation

Most areas of this soil support native vegetation and are used as habitat for wetland wildlife (fig. 5). A few areas have been developed for recreational use. Table 3 lists characteristic vegetation for the soils in the survey area. Because the species listed generally are more easily established and require less maintenance than other species, they should be selected for planting during beautification and landscaping.

Threatened or Endangered Plants and Animals

Threatened or endangered plants and animals in areas of this soil may include the following—

Birds: Bald eagle, white-crowned pigeon, wood stork
Reptiles: American crocodile

Interpretations

The wetness, an excessive amount of humus, and

the flooding are severe limitations affecting most uses of this soil, including most kinds of building site and recreational development and sanitary facilities. Tables 4, 6, and 7 provide more detailed information about these limitations.

7—Udorthents-Urban land complex

Geographic Setting

This map unit is in constructed upland areas adjacent to areas of water throughout the keys. Individual areas

Figure 5.—Vegetation in an area of Keylargo muck, tidal. Prop roots are characteristic of the red mangrove.

are subject to rare flooding from hurricanes and other tropical storms. Elevations vary, depending on the thickness of the fill material, but they are dominantly 3 to 10 feet above sea level, according to National Geodetic Vertical Datum of 1929.

Map Unit Composition

The Udorthents dominantly consist of crushed oolitic limestone or coral bedrock that has been spread over the original soil material. They commonly are about 32 inches of extremely gravelly sand underlain by about 40 inches of marl. The marl is underlain by coral bedrock. Other areas of soils are underlain by muck and other soil material. Houses and other urban structures cover up to 40 percent of most areas of the Udorthents; however, the soils can still be observed.

Geographically Associated Soils

Soils that are associated in this map unit are all of the other soils that are in the keys.

Drainage and Permeability

The Udorthents are moderately well drained. They have a seasonal high water table at a depth of 2 to 4 feet during the wet periods of most years. Permeability is variable.

Use and Vegetation

This map unit generally supports no vegetation. The stones and droughtiness are severe limitations affecting any kind of landscaping activity. The Udorthents were developed for urban use, and many areas are being used for this purpose (fig. 6).

Interpretations

The stones, seepage, and the wetness are moderate or severe limitations affecting most uses of this map unit, including most kinds of building site and recreational development and sanitary facilities. Tables 4, 6, and 7 provide more detailed information about these limitations.

8—Rock outcrop-Cudjoe complex, tidal

Geographic Setting

This map unit is in mangrove swamps throughout the keys. Individual areas are frequently flooded by tides. Elevations are 0 to 1 foot above sea level, according to National Geodetic Vertical Datum of 1929. The mean annual temperature ranges from 75 to 78 degrees F, and the mean annual precipitation ranges from 40 to 50 inches.

Map Unit Composition

Approximately 60 percent of this map unit consists of areas of exposed bedrock. These areas are dominantly 1 to 4 inches above the surface of the surrounding soil and range from approximately 2 feet to more than 200 feet in diameter. The Cudjoe soil is dominant in about 40 percent of this map unit. Areas that have different uses and interpretations are rare and generally are adjacent to the boundaries of the map unit.

Geographically Associated Soils

Soils that are associated with the Cudjoe soil are the well drained, mineral Keyvaca and Pennekamp soils, moderately well drained, organic Matecumbe soils, and somewhat poorly drained, marly Saddlebunch soils in the higher positions on the landscape; the poorly drained, marly Keywest and Lignumvitae soils in landscape positions similar to those of the Cudjoe soil; and the very poorly drained, organic Islamorada, Keylargo, and Tavernier soils in the lower positions on the landscape.

Drainage and Permeability

The Cudjoe soil is poorly drained. The seasonal high water table is within a depth of 6 inches during the wet periods of most years. Permeability is moderate or moderately rapid.

Use and Vegetation

Most areas of this map unit support native vegetation and are used as habitat for wetland wildlife. Some areas have been developed for residential, urban, or recreational use. Table 3 lists characteristic vegetation for the soils in the survey area. Because the species listed generally are more easily established and require less maintenance than other species, they should be selected for planting during beautification and landscaping.

Threatened or Endangered Plants and Animals

Threatened or endangered plants and animals in areas of this map unit may include the following—

Birds: Bald eagle, white-crowned pigeon, wood stork, peregrine falcon
Reptiles: American crocodile, striped mud turtle

Interpretations

The flooding, the depth to bedrock, and the wetness are severe limitations affecting most uses of this map unit, including most kinds of building site and recreational development and sanitary facilities. Tables 4, 6, and 7 provide more detailed information about these limitations.

Figure 6.—Residential development in an area of Udorthents-Urban land complex adjacent to water.

9—Lignumvitae marl, tidal

Geographic Setting

This soil is dominantly on the middle and lower keys in mangrove swamps. Individual areas are frequently flooded by tides. Elevations are dominantly at sea level, according to National Geodetic Vertical Datum of 1929. The mean annual temperature ranges from 75 to 78 degrees F, and the mean annual precipitation ranges from 40 to 50 inches.

Map Unit Composition

The Lignumvitae soil is dominant in this map unit. Areas that have different uses and interpretations are rare and generally are adjacent to the boundaries of the map unit.

Geographically Associated Soils

Soils that are associated with the Lignumvitae soil are the well drained, mineral Keyvaca and Pennekamp soils, moderately well drained, organic Matecumbe soils, and somewhat poorly drained, marly Saddlebunch soils in the higher positions on the landscape; the poorly drained, marly Cudjoe and Keywest soils in landscape positions similar to those of the Lignumvitae soil; and the very poorly drained, organic Islamorada, Keylargo, and Tavernier soils in the lower positions on the landscape.

Drainage and Permeability

The Lignumvitae soil is poorly drained. The seasonal high water table is within a depth of 6 inches during the

Figure 7.—Lignumvitae marl, tidal, provides anhingas with habitat for nesting and an access area for feeding.

wet periods of most years. Permeability is moderate or moderately rapid.

Use and Vegetation

Most areas of this soil support native vegetation and are used as habitat for wetland wildlife (fig. 7). Some areas have been developed for residential, urban, or recreational use. Table 3 lists characteristic vegetation for the soils in the survey area. Because the species listed generally are more easily established and require less maintenance than other species, they should be selected for planting during beautification and landscaping.

Threatened or Endangered Plants and Animals

Threatened or endangered plants and animals in areas of this soil may include the following—

Birds: Bald eagle, white-crowned pigeon, wood stork
Reptiles: American crocodile, striped mud turtle

Interpretations

Depth to bedrock, the flooding, and the wetness are severe limitations affecting most uses of this soil, including most kinds of building site and recreational development and sanitary facilities. Tables 4, 6, and 7 provide more detailed information about these limitations.

11—Urban land

Geographic Setting

This map unit is on Key West and the adjacent, smaller keys. Individual areas are subject to rare flooding from hurricanes and other tropical storms. Elevations are dominantly 3 to 10 feet above sea level, according to National Geodetic Vertical Datum of 1929.

Map Unit Composition

This map unit is covered by asphalt, concrete, buildings, and other impervious surfaces. The natural soil is covered and cannot be readily observed. Urban land makes up about 80 percent of most areas of this map unit. The undeveloped areas of this map unit include Udorthents, which were developed by spreading crushed bedrock over the original soil material.

Geographically Associated Soils

The Urban land is associated with Udorthents and Beaches.

Drainage and Permeability

The drainage and permeability of the Urban land are variable.

Use and Vegetation

Most areas of Urban land are covered by impervious surfaces. Grasses and other plants selected for planting during landscaping are dominant in the areas that support vegetation.

Interpretations

Soil properties in this map unit are variable; therefore, careful onsite investigation is needed to determine the limitations for any proposed use.

12—Rock outcrop-Cudjoe complex, frequently flooded

Geographic Setting

This map unit is on low tropical hammocks and in sawgrass marshes in the uplands throughout the keys.

Individual areas are subject to frequent flooding from hurricanes and other tropical storms. Elevations range from 1 to 3 feet above sea level, according to National Geodetic Vertical Datum of 1929. The mean annual temperature ranges from 75 to 78 degrees F, and the mean annual precipitation ranges from 40 to 50 inches.

Map Unit Composition

Approximately 55 percent of this map unit consists of areas of exposed bedrock. These areas are dominantly 1 to 4 inches above the surface of the surrounding soil and range from approximately 2 feet to more than 200 feet in diameter. The Cudjoe soil is dominant in about 45 percent of this map unit. Areas that have different uses and interpretations are rare and generally are adjacent to the boundaries of the map unit.

Geographically Associated Soils

Soils that are associated with the Cudjoe soil are the well drained, mineral Keyvaca and Pennekamp soils, moderately well drained, organic Matecumbe soils, and somewhat poorly drained, marly Saddlebunch soils in the higher positions on the landscape; the poorly drained, marly Keywest and Lignumvitae soils in landscape positions similar to those of the Cudjoe soil; and the very poorly drained, organic Islamorada, Keylargo, and Tavernier soils in the lower positions on the landscape.

Drainage and Permeability

The Cudjoe soil is poorly drained. The seasonal high water table is within a depth of 6 inches during the wet periods of most years. Permeability is moderate or moderately rapid.

Use and Vegetation

Most areas of this map unit support native vegetation and are used as habitat for wetland and woodland wildlife. Some areas have been developed for residential, urban, or recreational use. Table 3 lists characteristic vegetation for the soils in the survey area. Because the species listed generally are more easily established and require less maintenance than other species, they should be selected for planting during beautification and landscaping.

Threatened or Endangered Plants and Animals

Threatened or endangered plants and animals in areas of this map unit may include the following—

Mammals: Key deer, Big Cypress fox squirrel
Birds: Bald eagle, white-crowned pigeon, wood stork

Interpretations

The flooding, the depth to bedrock, and the wetness are severe limitations affecting most uses of this map unit, including most kinds of building site and recreational development and sanitary facilities. Tables 4, 6, and 7 provide more detailed information about these limitations.

13—Keyvaca very gravelly loam, extremely stony

Geographic Setting

This soil is on everglade flatwoods in the uplands of Big Pine Key and the adjacent keys. About 10 percent of the surface of this soil is covered with stones that are dominantly 10 to 20 inches in diameter. Individual areas are subject to rare flooding from hurricanes and other tropical storms. Elevations are dominantly 4 to 6 feet above sea level, according to National Geodetic Vertical Datum of 1929. The mean annual temperature is about 78 degrees F, and mean annual precipitation is about 50 inches.

Map Unit Composition

The Keyvaca soil is dominant in this map unit. Areas that have different uses and interpretations are rare and generally are adjacent to the boundaries of the map unit.

Geographically Associated Soils

Soils that are associated with the Keyvaca soil are the moderately well drained, organic Matecumbe soils and somewhat poorly drained, marly Saddlebunch soils in the slightly lower positions on the landscape and the poorly drained, marly Cudjoe, Lignumvitae, and Keywest soils and very poorly drained, organic Islamorada, Key Largo, and Tavernier soils in the significantly lower positions on the landscape.

Drainage and Permeability

The Keyvaca soil is well drained. It has a seasonal high water table at a depth of 3 to 5 feet during the wet periods of most years. Permeability is moderately rapid.

Use and Vegetation

Most areas of this soil support native vegetation and are used as habitat for woodland wildlife (fig. 8). Some areas have been developed for residential, urban, or recreational use. Table 3 lists characteristic vegetation for the soils in the survey area. Because the species listed generally are more easily established and require less maintenance than other species, they should be selected for planting during beautification and landscaping.

Threatened or Endangered Plants and Animals

Threatened or endangered plants and animals in areas of this soil may include the following—

Figure 8.—Characteristic vegetation in an area of Keyvaca very gravelly loam, extremely stony.

Trees: Thatch palm, buccaneer-palm, Deering's tree cactus
Shrubs: Pride-of-big-pine
Herbaceous plants: Spleenworts, orchids, ferns, twisted air plant
Mammals: Key deer, Key Largo cotton mouse, Key Largo woodrat, Big Cypress fox squirrel
Birds: Bald eagle, white-crowned pigeon, wood stork

Interpretations

Depth to bedrock and the flooding are severe limitations affecting most uses of this soil, including most kinds of building site and recreational development and sanitary facilities. Tables 4, 6, and 7 provide more detailed information about these limitations.

15—Cudjoe marl, tidal

Geographic Setting

This soil is dominantly on the lower keys in mangrove swamps. Individual areas are frequently flooded by tides. Elevations are 0 to 1 foot above sea level, according to National Geodetic Vertical Datum of 1929. The mean annual temperature ranges from 75 to 78

degrees F, and the mean annual precipitation ranges from 40 to 50 inches.

Map Unit Composition

The Cudjoe soil is dominant in this map unit. Areas that have different uses and interpretations are rare and generally are adjacent to the boundaries of the map unit.

Geographically Associated Soils

Soils that are associated with the Cudjoe soil are the well drained, mineral Keyvaca and Pennekamp soils, moderately well drained, organic Matecumbe soils, and somewhat poorly drained, marly Saddlebunch soils in the higher positions on the landscape; the poorly drained, marly Keywest and Lignumvitae soils in landscape positions similar to those of the Cudjoe soil; and the very poorly drained, organic Islamorada, Keylargo, and Tavernier soils in the lower positions on the landscape.

Drainage and Permeability

The Cudjoe soil is poorly drained. The seasonal high water table is within a depth of 6 inches during the wet periods of most years. Permeability is moderate or moderately rapid.

Use and Vegetation

Most areas of this soil support native vegetation and are used as habitat for wetland wildlife. Some areas have been developed for residential, urban, or recreational use. Table 3 lists characteristic vegetation for the soils in the survey area. Because the species listed generally are more easily established and require less maintenance than other species, they should be selected for planting during beautification and landscaping.

Threatened or Endangered Plants and Animals

Threatened or endangered plants or animals in areas of this soil may include the following—

Birds: Bald eagle, white-crowned pigeon, wood stork, peregrine falcon
Reptiles: American crocodile, striped mud turtle

Interpretations

The flooding, depth to bedrock, and the wetness are severe limitations affecting most uses of this soil, including most kinds of building site and recreational development and sanitary facilities. Tables 4, 6, and 7 provide more detailed information about these limitations.

16—Bahiahonda fine sand, 0 to 3 percent slopes

Geographic Setting

This soil is on coastal strands and tropical hammocks in the uplands on Bahia Honda Key and Long Key. Individual areas are subject to rare flooding from hurricanes and other tropical storms. Elevations are dominantly 4 to 7 feet above sea level, according to National Geodetic Vertical Datum of 1929.

Map Unit Composition

The Bahiahonda soil is dominant in this map unit. Soils in areas on Long Key are wetter than the Bahiahonda soil and have slightly more limitations. They have a high water table at a depth of 1.5 to 2.5 feet. Areas that have different uses and interpretations are rare and generally are adjacent to the boundaries of the map unit.

Geographically Associated Soils

Soils that are associated with the Bahiahonda soil are the moderately well drained, organic Matecumbe soils in landscape positions similar to those of the Bahiahonda soil; the poorly drained, marly Cudjoe soils in the slightly lower positions on the landscape; and the very poorly drained, organic Islamorada and Keylargo soils and Beaches in the significantly lower positions on the landscape.

Drainage and Permeability

The Bahiahonda soil is moderately well drained. It has a seasonal high water table at a depth of 2.5 to 3.5 feet during the wet periods of most years. Permeability is rapid.

Use and Vegetation

Most areas of this soil support native vegetation and are used as habitat for woodland wildlife. A few areas have been developed for recreational use. Some areas support invader, or exotic, species. These invader species are dominantly Australian pine. Table 3 lists characteristic vegetation for the soils in the survey area. Because the species listed generally are more easily established and require less maintenance than other species, they should be selected for planting during beautification and landscaping.

Threatened or Endangered Plants and Animals

Threatened or endangered plants and animals in areas of this soil may include the following—

Trees: Deering's tree cactus
Shrubs: Pride-of-big-pine
Herbaceous plants: Twisted air plant, small-flowered lily-thorn, young-palm orchid

Mammals: Big Cypress fox squirrel
Birds: Bald eagle, white-crowned pigeon, wood stork

Interpretations

The wetness, the flooding, and seepage are severe limitations affecting most uses of this soil, including most kinds of building site and recreational development and sanitary facilities. Tables 4, 6, and 7 provide more detailed information about these limitations.

17—Keywest marl, tidal

Geographic Setting

This soil is dominantly on the lower keys in mangrove swamps. Individual areas are frequently flooded by tides. Elevations are dominantly 0 to 1 foot above sea level, according to National Geodetic Vertical Datum of 1929. The mean annual temperature ranges from 75 to 78 degrees F, and the mean annual precipitation ranges from 40 to 50 inches.

Map Unit Composition

The Keywest soil is dominant in this map unit. Soils in areas on Boot Key do not have a layer of muck; whereas, the Keywest soil generally has a layer of muck. This difference, however, does not affect the uses and interpretations of the soils. Areas that have different uses and interpretations are rare and generally are adjacent to the boundaries of the map unit.

Geographically Associated Soils

Soils that are associated with the Keywest soil are the well drained, mineral Keyvaca and Pennekamp soils, moderately well drained, organic Matecumbe soils, and somewhat poorly drained, marly Saddlebunch soils in the higher positions on the landscape and the very poorly drained, organic Islamorada, Keylargo, and Tavernier soils in the lower positions on the landscape.

Drainage and Permeability

The Keywest soil is poorly drained. The seasonal high water table is within a depth of 6 inches during the wet periods of most years. Permeability is moderate or moderately rapid.

Use and Vegetation

Most areas of this soil support native vegetation and are used as habitat for wetland wildlife. Some areas have been developed for residential, urban, or recreational use. Table 3 lists characteristic vegetation for the soils in the survey area. Because the species listed generally are more easily established and require less maintenance than other species, they should be selected for planting during beautification and landscaping.

Threatened or Endangered Plants and Animals

Threatened or endangered plants and animals in areas of this soil may include the following—

Birds: Bald eagle, white-crowned pigeon, wood stork, peregrine falcon
Reptiles: American crocodile, striped mud turtle

Interpretations

The flooding and the wetness are severe limitations affecting most uses of this soil, including most kinds of building site and recreational development and sanitary facilities. Tables 4, 6, and 7 provide more detailed information about these limitations.

18—Beaches

Geographic Setting

This map unit consists of barren areas adjacent to the Atlantic Ocean on the lower keys. Individual areas are subject to shallow flooding by tides and to deep flooding from hurricanes and other tropical storms. Elevations are at or near sea level, according to National Geodetic Vertical Datum of 1929.

Map Unit Composition

The Beaches are miscellaneous areas that have been reworked by the tides. They commonly consist of about 16 inches of sand underlain by about 44 inches of fine sand. The fine sand is underlain by muck and other soil or nonsoil material at a depth of about 60 inches. The width and shape of the Beaches can change during each major storm.

Geographically Associated Soils

The Beaches are adjacent to Bahiahonda soils (fig. 9). They are also adjacent to Urban land and water. The Bahiahonda soils and the Urban land are in the higher positions on the landscape.

Drainage and Permeability

This map unit is poorly drained. It has a seasonal high water table at the surface. Permeability is rapid or very rapid.

Use and Vegetation

Most areas of this map unit are not vegetated. The Beaches are used for recreational activities, such as sunbathing and fishing, and as access areas for swimming and wading.

Figure 9.—An area of Bahiahonda soils in the background and an area of Beaches in the foreground. Both areas are used for recreation.

Interpretations

Because of the unique location of the Beaches and their value for recreational activities, other uses are not practical and interpretations have not been provided.

19—Saddlebunch marl, occasionally flooded

Geographic Setting

This soil is on low tropical hammocks on Big Pine Key and the adjacent keys. Approximately 8 percent of this map unit consists of areas where limestone bedrock is exposed at the surface. Individual areas are subject to flooding from storm tides, hurricanes, and runoff from the adjacent, higher areas. The mean annual temperature ranges from 75 to 78 degrees F, and the mean annual precipitation ranges from 40 to 50 inches.

Map Unit Composition

The Saddlebunch soil is dominant in this map unit. Areas that have different uses and interpretations are rare and generally are adjacent to the boundaries of the map unit.

Geographically Associated Soils

Soils that are associated with the Saddlebunch soil are the well drained, mineral Keyvaca and Pennekamp soils in the higher positions on the landscape; the

moderately well drained, organic Matecumbe soils in landscape positions similar to those of the Saddlebunch soil; the poorly drained, marly Cudjoe, Lignumvitae, and Keywest soils in the slightly lower positions on the landscape; and the very poorly drained, organic Tavernier, Islamorada, and Keylargo soils in the significantly lower positions on the landscape.

Drainage and Permeability

The Saddlebunch soil is somewhat poorly drained. It has a seasonal high water table at a depth of 6 to 12 inches during the wet periods of most years. Permeability is moderate or moderately rapid.

Use and Vegetation

Most areas of this soil support native vegetation and are used as habitat for woodland wildlife (fig. 10). Some areas have been developed for residential, urban, or recreational use. Table 3 lists characteristic vegetation for the soils in the survey area. Because the species listed generally are more easily established and require less maintenance than other species, they should be selected for planting during beautification and landscaping.

Threatened or Endangered Plants and Animals

Threatened or endangered plants and animals in

Figure 10.—Characteristic vegetation in an area of Saddlebunch marl, occasionally flooded.

areas of this soil may include the following—

Trees: Thatch palm

Herbaceous plants: Spleenworts, orchids, ferns, twisted air plant

Mammals: Key deer, Big Cypress fox squirrel

Birds: Bald eagle, white-crowned pigeon, wood stork, peregrine falcon

Interpretations

Depth to bedrock, the flooding, and the wetness are severe limitations affecting most uses of this map unit, including most kinds of building site and recreational development and sanitary facilities. Tables 4, 6, and 7 provide more detailed information about these limitations.

Hydric Soils

In this section, hydric soils are defined and described and the hydric soils in the survey area are listed.

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology *(4, 6)*. Criteria for each of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecologically facultative wetland plant species and obligate wetland plant species.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil *(11)*. These soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or a nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria which identify those soil properties unique to hydric soils have been established *(11)*. These criteria are used to identify a phase of a soil series that normally is associated with wetlands. The criteria used are selected soil properties that are documented in "Soil Taxonomy" *(9)* and in the "Soil Survey Manual" *(12)*. They are listed in "Hydric Soils of the United States" *(11)*.

If soils are wet enough for a long enough duration to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The list of hydric soil indicators can be used to make onsite determinations of hydric soils *(8)*. All hydric soil determinations should be based on observations made in the field.

Hydric soils are identified by examining the upper 12 inches of a soil in a freshly dug soil pit and checking for hydric indicators. The presence of one of the indicators *(8)* provides evidence that the soil is saturated at or near the surface at least seasonally or that it is inundated at least seasonally. The soil can be classified as a hydric soil when only one positive indicator is found.

The following map units meet the criteria for hydric soils *(11)* and, in addition, have at least one of the hydric soil indicators *(8)*. This list can help in planning land uses; however, onsite investigation is needed to determine the hydric soils on a specific site.

4	Rock outcrop-Tavernier complex, tidal
5	Islamorada muck, tidal
6	Keylargo muck, tidal
8	Rock outcrop-Cudjoe complex, tidal
9	Lignumvitae marl, tidal
12	Rock outcrop-Cudjoe complex, frequently flooded
15	Cudjoe marl, tidal
17	Keywest marl, tidal
18	Beaches

This soil survey can be used to locate probable areas of hydric soils. Map units that are made up of hydric soils, however, may have small areas, or inclusions, of nonhydric soils in the higher positions on the landscape, and map units made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landscape.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil

interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w*, *s*, or *c*.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 and IIIe-6.

Characteristic Plant Communities

In areas that have similar climate and topography, differences in the kind of vegetation produced in natural areas are closely related to the kind of soil. Effective establishment and maintenance are based on the relationships between the kind of soils, the kind of vegetation, and water.

Table 3 shows, for nearly all soils, the ecological community, the characteristic vegetation, and the average percentage of each species. Only those soils that have natural vegetation or can support natural vegetation are listed. Explanation of the column headings in table 3 follows.

An *ecological community* produces characteristic vegetation that differs from the characteristic vegetation of other ecological communities in kind, amount, or proportion of plants. The relationship between soils and vegetation was ascertained during this survey; thus, ecological communities can be determined directly from the soil map.

Characteristic vegetation—the grasses, forbs, trees, and shrubs that make up most of the potential climax plant community on each soil—is listed by common name. Under *composition*, the percentage of the total is given for each species making up the characteristic vegetation.

Ecological Communities

The concept of ecological communities is based on the awareness that a specific soil type commonly supports a specific vegetative community, which in turn provides the habitat needed by a specific wildlife species *(10)*. Recognizing the characteristics and values of the ecological communities can help in planning use and management of these communities *(5)*.

The following paragraphs describe the ecological communities in the survey area. The names of these communities are Coastal Strand, Everglade Flatwoods, Tropical Hammocks, Mangrove Swamp, and Sawgrass Marsh.

Coastal Strand ecological community. This community occurs along the Atlantic Ocean from south of Lower Matecumbe Key to east of Key West. It generally encompasses the area that is affected by salt spray from the Atlantic Ocean, the Gulf of Mexico, and saltwater bays.

This community is in nearly level to gently sloping areas. It is easily identified by its location adjacent to the Atlantic Ocean and by plants that are adapted to or influenced by the salty environment. The more inland parts of this community may include small areas of hammocks.

The Coastal Strand ecological community is highly endangered. Privately owned areas that are undeveloped are in demand for residences, hotels, and motels. This urban development can seriously affect the ecological community. Coastal strands play an important role in regulating wave action along the coast. This action tends to break away part of one beach and build up another. Structures and development that are not planned can alter this process and accelerate the erosion of beaches and coastal dunes. The clearing and leveling of dunes for development also can cause erosion because of the removal of the native vegetation that helps to hold the dune together and because of the removal of sand from the offshore transport system.

The coastal strand is an important area for recreational uses and wildlife habitat. These areas are in demand for recreational uses, but trampling can damage and destroy vegetation. When the plants die, their extensive root systems are no longer available to hold the dunes together. Even occasional use may degrade this fragile community. Coastal strands generally are not used for agriculture or as woodland.

Everglade Flatwoods ecological community. This community occurs on Big Pine Key and on the adjacent keys. Areas of the Tropical Hammocks ecological community generally are interspersed throughout this community.

This community occurs in nearly level areas. Porous pinnacle limestone bedrock is at a shallow depth. In many areas, there is little or no soil and the bedrock is at the surface. Water moves rapidly through the porous limestone; consequently, the sites are wet for only short periods following heavy rainfall.

Fire plays an important role in controlling hardwoods.

The prevention of fire can cause a successional move to a hardwood community. Building roads and canals can produce natural firebreaks that endanger areas of pine.

Decaying plant material is important because it produces weak acid. This acid dissolves the rock and, in time, helps in the formation of soil used during seed germination.

The Everglade Flatwoods ecological community is a good producer of cellulose, but the distance to woodland markets generally limits commercial production. If this ecological community is properly managed, native forage production and wildlife habitat are good. This ecological community provides a drier habitat for the wildlife that inhabit adjacent areas and serves as a buffer for wildlife in the area between the wetlands and the urban development near the coast.

Tropical Hammocks ecological community. This community occurs in elevated areas along the limestone ridges of the keys. Individual communities range from less than 1 acre to several acres in size.

This community generally is made up of thick clumps or stands of small- to medium-sized trees. Sites where disturbances have not occurred for several years have a more junglelike appearance. A heavy canopy closure, which causes deep interior shade, is prevalent. It moderates temperatures and helps to conserve moisture. Trees in this ecological community commonly have dense, heavy, strong wood and shallow, spreading root systems. These characteristics help the trees to adapt to a harsh environment that includes wind, periodic drought, and salt spray.

The Tropical Hammocks ecological community is probably the most endangered ecological community in the keys. It is endangered because it is not widespread and because it has received considerable pressure for other land uses. Incorporating all existing Tropical Hammocks ecological communities into an overall land use plan help to ensure the continued use of these communities as areas for hurricane protection, landscaping, greenbelts, parks, and wildlife habitat.

Mangrove Swamp ecological community. This community occurs primarily along saltwater shorelines on most of the keys. The coastlines are subject to mild wave action. They are along back bays and the fringes of estuaries.

Mangroves grow in thickets in coastal areas. They are woody plants that have fleshy leaves and grow to a medium height. In areas of marly soils they range from 3 to 10 feet in height, and in areas of organic soils they range from 10 to 20 feet in height. In most areas the red mangrove is nearest the shoreline. Prop roots are characteristic of this species. The black mangrove and the white mangrove, however, have modified vertical roots to facilitate in respiration.

This ecological community plays an especially important role in protecting and stabilizing shorelines. Some evidence exists that mangroves can contribute to land building by trapping sediments. This ecological community buffers the wind and waves during storm tides. The most important function of this community probably is to change the detrital base that has accumulated beneath it into estuarine deposits. The estuaries support higher marine life. Many mangrove swamps have been destroyed or altered when dredging and filling for urban development. Human activities in adjacent areas can change waterflow patterns and affect the plant composition of this ecological community.

Sawgrass Marsh ecological community. This community occurs on Big Pine Key and on the adjacent keys.

This community occurs as a partially open expanse of sawgrass and scattered trees in areas where the soil is saturated or covered with surface water during part of the year.

The sawgrass marshes serve as a filter system for water. They protect natural bodies of water from eutrophication. Marshes retain water during droughty periods and also slow down the movement of water during flooding. Their principal environmental value is related to water quality and water quantity.

The installation of drainage systems, subsidence of organic soils, and fires have reduced the quantity of sawgrass and promoted the growth of other plants in many areas.

Under natural conditions, the Sawgrass Marsh ecological community is one of the ecological communities least resistant to change. Fires and drainage systems can completely alter the characteristics of this community within 10 to 20 years.

Recreation

In table 4, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. Although Beaches generally are not rated for recreational suitability, they provide excellent opportunities for recreation in the survey area (fig. 11). The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites,

Figure 11.—Beaches provide excellent access to water-related recreational activities.

and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 4, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 4 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 7 and interpretations for dwellings without basements and for local roads and streets in table 6.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes, stones, or boulders that increase the cost of shaping

sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 5, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, partridge pea, and switchgrass.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are mangrove, stopper, poisonwood, gumbo-limbo, strangler fig, and locustberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are wild plum, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. An example of coniferous plants is pine.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are sawgrass, saltwort, and glasswort.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous

Figure 12.—An area of Keyvaca very gravelly loam, extremely stony, which provides excellent wildlife habitat for key deer.

plants. Wildlife attracted to these areas include eagles, falcons, mice, squirrels, and deer (fig. 12).

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, egrets, herons, shore birds, alligators, mink, and beaver.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given

for building site development and sanitary facilities. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet, and because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

Table 6 shows the degree and kind of soil limitations that affect dwellings without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe (fig. 13).

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. Depth to a high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, depth to a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost-action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil

Figure 13.—Udorthents are dominant in areas used for building sites because most soils in the survey area have severe limitations affecting building site development.

properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 7 shows the degree and the kind of soil limitations that affect septic tank absorption fields and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 7 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and

site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. Because of the shallow depth to bedrock in the survey area, trench landfills are not rated in the table.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 7 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, depth to a water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 8 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index generally are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 9 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They influence the soil's adsorption of cations, moisture retention, the shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 9, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 10 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the infiltration of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 10 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year). *Frequent* means that flooding occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 10 are the depth to the seasonal high water table, the kind of water table, and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 10. An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a

depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. Table 10 shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(9)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 11 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquents (*Fluv*, meaning fluvial, flood plain, or delta deposition, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Tropic* identifies the subgroup that differs from the typical subgroup by having a tropical or subtropical climate. An example is Tropic Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is coarse-silty, carbonatic, isohyperthermic Tropic Fluvaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the underlying material within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" *(12)*. Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" *(9)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Bahiahonda Series

The Bahiahonda series consists of moderately well drained soils that are deep to rippable coral limestone

bedrock. These soils formed in sandy marine material and shells overlying the limestone bedrock. They are on uplands. Slopes range from 0 to 3 percent.

Taxonomic class: Isohyperthermic, uncoated Aquic Quartzipsamments

Typical Pedon

Bahiahonda fine sand, in an area of Bahiahonda fine sand, 0 to 3 percent slopes, on Bahia Honda Key; 800 feet south of U.S. Highway 1 from the entrance to Bahia Honda State Park; NE¼SW¼ sec. 25, T. 66 S., R. 30 E.

A—0 to 8 inches; dark gray (10YR 4/1) fine sand; single grained; loose; common fine and medium roots; neutral; abrupt smooth boundary.

Bw—8 to 35 inches; light gray (10YR 7/2) fine sand; single grained; loose; few fine and medium roots; neutral; abrupt smooth boundary.

Cg1—35 to 68 inches; white (10YR 8/1) sand; single grained; loose; few fine roots; mildly alkaline; clear smooth boundary.

Cg2—68 to 82 inches; white (10YR 8/1) very gravelly sand; single grained; loose; about 40 percent, by volume, limestone and shell fragments less than 1 inch in size; moderately alkaline; abrupt smooth boundary.

2R—82 inches; soft to hard, rippable coral limestone bedrock.

Range in Characteristics

The depth to bedrock is 60 to 90 inches.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 to 3. The texture is sand or fine sand. Reaction is neutral or mildly alkaline.

The Bw horizon has hue of 10YR, value of 6 or 7, and chroma of 2 or 3. The texture is sand or fine sand. The content of shell fragments is less than 10 percent, by volume. Reaction is neutral or mildly alkaline.

The Cg horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. The texture of the upper part of the Cg horizon is sand or fine sand. The content of shells is less than 10 percent. The texture of the lower part of the Cg horizon is gravelly sand or very gravelly sand. The content of shells that are dominantly less than 1 inch in size is 25 to 60 percent. Reaction in the lower part of the Cg horizon ranges from neutral to moderately alkaline.

Cudjoe Series

The Cudjoe series consists of poorly drained soils that are shallow to rippable coral or oolitic limestone bedrock. These soils formed in calcareous marl. They are in tidal areas and other flooded areas. Slopes are 0 to 1 percent.

Taxonomic class: Loamy, carbonatic, isohyperthermic, shallow Tropic Fluvaquents

Typical Pedon

Cudjoe marl, in an area of Cudjoe marl, tidal, on Plantation Key; 0.25 mile southwest of Treasure Harbor and 200 feet south of U.S. Highway 1; NW¼NW¼NW¼ sec. 24, T. 63 S., R. 37 E.

A1—0 to 9 inches; light gray (10YR 7/1) marl that has a texture of silt loam; weak coarse platy structure parting to weak fine subangular blocky; very friable; common fine and medium roots; common fine and very fine pores; strongly alkaline, calcareous, and effervescent; clear smooth boundary.

A2—9 to 16 inches; white (10YR 8/1) marl that has a texture of silt loam; weak coarse platy structure parting to weak fine subangular blocky; very friable; common fine roots; common fine and very fine pores; strongly alkaline, calcareous, and effervescent; about 5 percent limestone flags and pebbles in the lower 2 inches; abrupt smooth boundary.

2R—16 inches; soft to hard, rippable coral limestone bedrock.

Range in Characteristics

The depth to bedrock is 3 to 20 inches. Reaction ranges from neutral to moderately alkaline. The soils are calcareous and effervescent. The content of calcium carbonate is more than 90 percent. The content of coral or limestone fragments is less than 10 percent, by volume.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 8, and chroma of 1 or 2. If value is 4 or 5, chroma is 1. This horizon is marl that has a carbonate-free texture of silt or silt loam. In some pedons the lower part of the profile is a massive C horizon. This horizon has the same ranges in hue, value, chroma, and texture as the A horizon. In some pedons a sapric Oa horizon, which is less than 3 inches thick, overlies the bedrock.

Islamorada Series

The Islamorada series consists of very poorly drained soils that are moderately deep to rippable coral or oolitic limestone bedrock. These soils formed in sapric material. They are in tidal areas. Slopes are less than 1 percent.

Taxonomic class: Euic, isohyperthermic Lithic Troposaprists

Typical Pedon

Islamorada muck, in an area of Islamorada muck, tidal, on Lower Matecumbe Key; 1 mile southeast of Lignuum

Vitae Channel and 200 feet northwest of U.S. Highway 1; SW¼NE¼ sec. 15, T. 64 S., R. 36 E.

Oa1—0 to 5 inches; muck, black (5YR 2/1) rubbed and unrubbed; about 15 percent fiber, less than 5 percent rubbed; massive; nonsticky; about 40 percent, by volume, fine and medium live roots; neutral; clear smooth boundary.

Oa2—5 to 35 inches; muck, very dark gray (5YR 3/1) rubbed and unrubbed; about 35 percent fiber, less than 10 percent rubbed; massive; nonsticky; about 30 percent, by volume, fine and medium live roots; neutral; abrupt smooth boundary.

2R—35 inches; soft to hard, rippable coral limestone bedrock.

Range in Characteristics

The depth to bedrock is 20 to 50 inches. Reaction ranges from slightly acid to mildly alkaline.

The Oa horizon has hue of 5YR, value of 2 or 3, and chroma of 1 or 2. The content of fiber is 15 to 35 percent before rubbing and less than 15 percent after rubbing.

Keylargo Series

The Keylargo series consists of very poorly drained soils that are deep to rippable coral or oolitic limestone bedrock. These soils formed in sapric material. They are in tidal areas. Slopes are less than 1 percent.

Taxonomic class: Euic, isohyperthermic Typic Troposaprists

Typical Pedon

Keylargo muck, in an area of Keylargo muck, tidal, on Key Largo; 1 mile east of Steamboat Creek on Card Sound Road and 75 feet south of the road; SW¼NE¼ sec. 28, T. 59 S., R. 40 E.

Oa1—0 to 6 inches; muck, very dark gray (10YR 3/1) rubbed and unrubbed; about 20 percent fiber, less than 5 percent rubbed; massive; nonsticky; about 20 percent, by volume, fine and medium live roots; about 5 percent, by volume, mineral material; neutral; clear smooth boundary.

Oa2—6 to 70 inches; muck, dark reddish brown (5YR 3/2) rubbed and unrubbed; about 30 percent fiber, less than 5 percent rubbed; massive; nonsticky; about 20 percent, by volume, fine and medium live roots; about 2 percent, by volume, mineral material; neutral; abrupt smooth boundary.

2R—70 inches; soft to hard, rippable coral limestone bedrock.

Range in Characteristics

The depth to bedrock is 50 to 90 inches. Reaction ranges from slightly acid to mildly alkaline.

The Oa horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 3. The content of fiber is 15 to 30 percent before rubbing and less than 15 percent after rubbing.

Keyvaca Series

The Keyvaca series consists of well drained soils that are shallow to rippable oolitic limestone bedrock. These soils formed in material weathered from the oolitic limestone bedrock. They are on uplands. Slopes are 0 to 1 percent.

Taxonomic class: Loamy-skeletal, carbonatic, isohyperthermic Lithic Rendolls

Typical Pedon

Keyvaca very gravelly loam, in an area of Keyvaca very gravelly loam, extremely stony, on Big Pine Key; 2.2 miles northwest of U.S. Highway 1 on Key Deer Boulevard and 200 feet southwest of the road; SE¼SE¼NE¼ sec. 22, T. 66 S., R. 29 E.

A—0 to 4 inches; very dark brown (10YR 3/3) very gravelly loam; weak fine granular structure; very friable; many fine, medium, and large roots; about 5 percent, by volume, limestone fragments more than 3 inches in size and about 40 percent, by volume, limestone fragments less than 3 inches in size; moderately alkaline; abrupt wavy boundary.

R—4 inches; soft to hard, rippable oolitic limestone bedrock.

Range in Characteristics

The depth to bedrock is 3 to 6 inches. The content of stones, cobbles, and pebbles ranges from 35 to 55 percent, by volume.

The A horizon has hue of 7.5YR or 10YR and value and chroma of 2 or 3. The texture is gravelly sandy loam, gravelly loam, very gravelly sandy loam, and very gravelly loam or the cobbly and very cobbly analogs of those textures. The content of gravel-sized oolitic limestone fragments is 20 to 50 percent, and the content of cobble-sized fragments is 10 to 25 percent. The content of silt is less than 45 percent. Reaction is mildly alkaline or moderately alkaline.

Keywest Series

The Keywest series consists of poorly drained soils that are deep to rippable coral or oolitic limestone bedrock. These soils formed in calcareous marl. They are in tidal areas. Slopes are 0 to 1 percent.

Taxonomic class: Coarse-silty, carbonatic, isohyperthermic Thapto-Histic Tropic Fluvaquents

Typical Pedon

Keywest marl, in an area of Keywest marl, tidal, on Boot Key; 1.4 miles southeast of U.S. Highway 1 on County Road 931 and 50 feet northwest of the road; SE¼SE¼SW¼ sec. 16. T. 66 S., R. 32 E.

A—0 to 9 inches; light gray (10YR 7/1) marl that has a texture of silt loam; weak coarse platy structure parting to weak fine granular; very friable; common medium roots; common fine and very fine pores; about 5 percent, by volume, shell fragments; mildly alkaline, calcareous, and effervescent; abrupt smooth boundary.

Oa—9 to 15 inches; muck, dark brown (7.5YR 3/2) rubbed and unrubbed; about 30 percent, by volume, live roots; massive; very friable; neutral in calcium chloride; abrupt smooth boundary.

A/Oa—15 to 27 inches; gray and brown mucky marl; 70 percent, by volume, light brownish gray (10YR 6/2) marl and 30 percent, by volume, dark brown (10YR 4/3) muck; massive; very friable; about 3 percent, by volume, shell fragments; neutral in calcium chloride and moderately alkaline in water; clear smooth boundary.

Cg—27 to 65 inches; light gray (10YR 7/1) marl that has a texture of silt loam; massive; friable; few fine roots; few fine pores; thin strata of dominantly sand-sized shells; strongly alkaline; abrupt smooth boundary.

2R—65 inches; soft to hard, rippable oolitic limestone bedrock.

Range in Characteristics

The depth to bedrock is more than 50 inches. Reaction ranges from neutral to moderately alkaline. The soils are calcareous and effervescent. The content of calcium carbonate in the marl layers is more than 90 percent. The content of gravel-sized fragments is less than 10 percent, by volume, throughout the profile.

The A horizon has hue of 10YR or 2.5Y, value of 4 to 8, and chroma of 1 or 2. If value is 4 or 5, chroma is 1. The horizon is marl that has a carbonate-free texture of silt or silt loam.

The Oa horizon, if it occurs, has hue of 5YR to 10YR, value of 3 or 4, and chroma of 2 to 4. The content of fiber is 20 to 50 percent before rubbing and less than 10 percent after rubbing. Reaction is slightly acid to mildly alkaline in calcium chloride.

The A/Oa horizon, if it occurs, is neutral to moderately alkaline. The A part of this horizon has the same ranges in color and texture as the A horizon. The Oa portion has the same ranges in color and texture as the Oa horizon.

The Cg horizon has hue of 10YR or 2.5Y, value of 6 to 8, and chroma of 1 or 2. It is marl that has a carbonate-free texture of silt or silt loam. In some pedons the Cg horizon is stratified marl and sand-sized shell fragments.

Lignumvitae Series

The Lignumvitae series consists of poorly drained soils that are moderately deep to rippable coral or oolitic limestone bedrock. These soils formed in calcareous marl. They are in tidal areas. Slopes are 0 to 1 percent.

Taxonomic class: Coarse-silty, carbonatic, isohyperthermic Tropic Fluvaquents

Typical Pedon

Lignumvitae marl, in an area of Lignumvitae marl, tidal, on Windley Key; 0.1 mile southwest of Snake Creek Bridge and 200 feet north of U.S. Highway 1; NE¼NE¼NE¼ sec. 23, T. 63 S., R. 37 E.

A1—0 to 4 inches; light brownish gray (10YR 6/2) marl that has a texture of silt loam; weak coarse platy structure parting to moderate medium granular; very friable; common fine and very fine pores; neutral, calcareous, and effervescent; clear wavy boundary.

A2—4 to 32 inches; light gray (10YR 7/1) marl that has a texture of silt loam; weak coarse platy structure parting to weak fine granular; very friable; common fine and very fine pores; slightly alkaline, calcareous, and effervescent; abrupt irregular boundary.

2R—32 inches; soft to hard, rippable coral limestone bedrock.

Range in Characteristics

The depth to bedrock is dominantly 25 to 35 inches but can range from 20 to 40 inches. Reaction ranges from neutral to moderately alkaline. The soils are calcareous and effervescent. The content of calcium carbonate is more than 90 percent.

The A horizon has hue of 10YR or 2.5Y. value of 4 to 8, and chroma of 1 or 2. If value is 4 or 5, chroma is 1. The horizon is marl that has a carbonate-free texture of silt or silt loam. In some pedons the lower part of the profile is a massive C horizon. The content of coral or limestone fragments is less than 15 percent, by volume.

Matecumbe Series

The Matecumbe series consists of moderately well drained soils that are very shallow to rippable coral or oolitic limestone bedrock. These soils formed in organic material in varying stages of decomposition. They are on tropical hammocks. Slopes are 0 to 1 percent.

Taxonomic class: Euic, isohyperthermic Lithic Tropofolists

Typical Pedon

Matecumbe muck, in an area of Matecumbe muck, occasionally flooded, on Key Largo; SW¼SW¼SW¼ sec. 3, T. 59 S., R. 40 E.

Oa—0 to 6 inches; black (10YR 2/1) muck; about 15 percent fiber, less than 5 percent rubbed; about 5 percent, by weight, sandy and loamy material; structureless; very friable; about 30 percent, by volume, live roots; about 10 percent, by volume, limestone fragments less than 3 inches in size; medium acid; abrupt smooth boundary.

2R—6 inches; soft to hard, rippable coral limestone bedrock.

Range in Characteristics

The depth to limestone or coral limestone bedrock is 2 to 9 inches. The Oa horizon has hue of 10YR to 5YR, value of 3 or less, and chroma of 1 or 2. It is muck, mucky peat, or gravelly muck that has a mineral content of less than 20 percent. The content of gravel-sized limestone or coral fragments ranges from 5 to 35 percent, by volume. Reaction ranges from medium acid to neutral.

Pennekamp Series

The Pennekamp series consists of well drained soils that are shallow to rippable coral limestone bedrock. These soils formed in material weathered from the coral limestone bedrock. They generally have a thin overburden of sapric material. They are on uplands. Slopes range from 0 to 2 percent.

Taxonomic class: Loamy-skeletal, carbonatic, isohyperthermic Lithic Rendolls

Typical Pedon

Pennekamp gravelly muck, in an area of Pennekamp gravelly muck, 0 to 2 percent slopes, extremely stony, on Key Largo; 600 feet east of U.S. Highway 1, about 100 feet south of the service road entrance at Pennekamp State Park; 800 feet north and 150 feet east of the southwest corner of sec. 14, T. 61 S., R. 39 E.

Oa—0 to 3 inches; black (10YR 2/1) gravelly muck; about 15 percent fiber, less than 5 percent rubbed; about 40 percent, by weight, mineral material; structureless; very friable; many fine, medium, and large roots; about 5 percent, by volume, coral fragments more than 3 inches in size and about 15 percent, by volume, coral fragments less than 3 inches in size; medium acid; abrupt smooth boundary.

A—3 to 8 inches; dark reddish brown (5YR 3/2) very gravelly loam; weak fine granular structure; very friable; about 50 percent, by volume, coral fragments less than 3 inches in size and about 10 percent, by volume, coral fragments more than 3 inches in size; many fine and medium roots; mildly alkaline; abrupt wavy boundary.

R—8 inches; soft to hard, rippable coral limestone bedrock.

Range in Characteristics

The depth to bedrock is 4 to 16 inches.

The Oa horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 or 2. It is muck or gravelly muck. The content of coral fragments is 5 to 25 percent, by volume. Reaction is medium acid or slightly acid.

The A horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 3. The texture is very gravelly loam, very gravelly silt loam, extremely gravelly loam, or extremely gravelly silt loam. The content of coral fragments is 35 to 75 percent, by volume, and the content of silt is more than 45 percent. Reaction is mildly alkaline or moderately alkaline.

Saddlebunch Series

The Saddlebunch series consists of somewhat poorly drained soils that are shallow to rippable coral or oolitic limestone bedrock. These soils formed in calcareous marl. They are on uplands that are flooded. Slopes are 0 to 1 percent.

Taxonomic class: Loamy, carbonatic, isohyperthermic, shallow Tropic Fluvaquents

Typical Pedon

Saddlebunch marl, in an area of Saddlebunch marl, occasionally flooded, on Sugarloaf Key; 2.7 miles south on County Road 939 from its junction with U.S. Highway 1, about 0.8 miles east and 1.05 miles north on County Road 939A and 100 feet west of the road.

A1—0 to 5 inches; grayish brown (10YR 5/2) marl that has a texture of silt loam; weak coarse platy structure parting to moderate fine granular; very friable; mildly alkaline, calcareous, and effervescent; clear smooth boundary.

A2—5 to 17 inches; light gray (10YR 7/1) marl that has a texture of silt loam; weak coarse platy structure parting to weak fine granular; very friable; few fine and very fine pores; moderately alkaline, calcareous, and effervescent; abrupt irregular boundary.

2R—17 inches; soft to hard, rippable oolitic limestone bedrock.

Range in Characteristics

The thickness of the solum and the depth to oolitic limestone or coral bedrock are 4 to 20 inches. Reaction

ranges from neutral to moderately alkaline.

The A1 horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. The A2 horizon has hue of 10YR or 2.5Y, value of 6 to 8, and chroma of 1 or 2. The A horizon is marl that has a carbonate-free texture of silt or silt loam. It is calcareous and effervescent. The content of calcium carbonate is more than 90 percent, by volume. The content of coral or limestone fragments is less than 15 percent, by volume.

Tavernier Series

The Tavernier series consists of very poorly drained soils that are shallow to rippable coral limestone bedrock. These soils formed in sapric material. They are in tidal areas. Slopes are less than 1 percent.

Taxonomic class: Euic, isohyperthermic, shallow Lithic Troposaprists

Typical Pedon

Tavernier muck, in an area of Rock outcrop-Tavernier complex, tidal, on Key Largo; 0.25 mile east of Crocodile Lake and 150 feet south of State Road 905; SE¼SE¼ sec. 23, T. 59 S., R. 40 E.

Oa—0 to 8 inches; muck, very dark grayish brown (10YR 3/2) rubbed and unrubbed; about 20 percent fiber, less than 5 percent rubbed; massive; nonsticky; about 30 percent, by volume, fine and medium live roots; about 10 percent, by volume, limestone fragments less than 3 inches in size; slightly acid; abrupt smooth boundary.

2R—8 inches; soft to hard, rippable coral limestone bedrock.

Range in Characteristics

The depth to bedrock is dominantly 3 to 16 inches but ranges to 20 inches. Reaction ranges from slightly acid to mildly alkaline. The content of gravel-sized coral or limestone fragments ranges from 0 to 20 percent, by volume.

The Oa horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 3. The content of fiber is 15 to 50 percent before rubbing and less than 10 percent after rubbing.

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Glossary

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic)—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated)—Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as fire, that exposes the surface.

Eutrophication. The process by which a body of water becomes either naturally or by pollution rich in dissolved nutrients (as phosphates) and often shallow with a seasonal deficiency in dissolved oxygen.

Excess salt (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Facultative wetland plants. Plants that generally grow (estimated probability of more than 67 percent to 99 percent) in wetlands but also (estimated probability of 1 percent to 33 percent) in nonwetlands.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, up to 3 inches (7.6 centimeters) in diameter.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main

feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Large stones (in tables). Rock fragments that are 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Obligate wetland plants. Plants that almost always grow (estimated probability of more than 99 percent) in wetlands under natural conditions but which may also rarely grow (estimated probability of less than 1 percent) in nonwetlands.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs the growth of plants. A saline soil

does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-86 at Key West, Florida)

Month	Temperature					Precipitation			
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more
	°F	°F	°F	°F	°F	In	In	In	
January----	74.3	64.3	69.3	83	48	2.24	0.22	3.69	3
February---	75.0	65.1	70.1	83	50	1.89	.80	2.80	4
March------	78.6	69.0	73.8	86	55	1.54	.33	2.49	3
April------	81.8	72.5	77.2	87	63	1.77	.27	2.90	2
May--------	85.0	75.8	80.4	90	68	3.27	.96	5.13	5
June-------	87.6	78.2	82.9	92	71	5.14	2.20	7.63	8
July-------	89.1	79.7	84.4	93	72	3.64	1.72	5.30	7
August-----	89.2	79.3	84.3	92	72	5.09	3.00	6.95	9
September--	87.9	78.4	83.2	91	72	6.22	3.38	8.71	10
October----	84.5	75.7	80.1	90	68	4.51	1.76	6.81	7
November---	79.9	71.1	75.5	86	57	2.65	.43	4.33	4
December---	75.9	66.6	71.3	84	49	2.13	.45	3.43	3
Yearly:									
Average--	82.4	73.0	77.7	---	---	---	---	---	---
Extreme--	---	---	---	93	46	---	---	---	---
Total----	---	---	---	---	---	40.09	30.47	48.76	65

TABLE 2.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
2	Pennekamp gravelly muck, 0 to 2 percent slopes, extremely stony	6,980	10.6
3	Matecumbe muck, occasionally flooded	5,430	8.2
4	Rock outcrop-Tavernier complex, tidal	920	1.4
5	Islamorada muck, tidal	5,890	8.9
6	Keylargo muck, tidal	12,240	18.5
7	Udorthents-Urban land complex	10,940	16.6
8	Rock outcrop-Cudjoe complex, tidal	5,750	8.7
9	Lignumvitae marl, tidal	1,360	2.1
11	Urban land	3,080	4.7
12	Rock outcrop-Cudjoe complex, frequently flooded	1,840	2.8
13	Keyvaca very gravelly loam, extremely stony	2,780	4.2
15	Cudjoe marl, tidal	3,410	5.2
16	Bahiahonda fine sand, 0 to 3 percent slopes	240	0.4
17	Keywest marl, tidal	450	0.7
18	Beaches	100	0.1
19	Saddlebunch marl, occasionally flooded	1,140	1.7
	Water	3,450	5.2
	Total	66,000	100.0

TABLE 3.--CHARACTERISTIC PLANT COMMUNITIES

(Only the soils that support natural vegetation are listed)

Soil name and map symbol	Ecological community	Characteristic vegetation	Composition
			Pct
2: Pennekamp	Tropical Hammocks	Poisonwood	30
		Wild tamarind	10
		Gumbo-limbo	10
		Strangler fig	10
		Wild coffee	5
		Canella	5
3: Matecumbe	Tropical Hammocks	Poisonwood	15
		Wild tamarind	10
		Mahogany	10
		Deering's tree cactus	5
		Crabwood	5
		Thatch palm	5
		Locustberry	5
		Paradise tree	5
		Satinleaf	5
		Stopper	5
4*:			
Rock outcrop.			
Tavernier	Mangrove Swamp	Red mangrove	80
		Black mangrove	10
		Glasswort	5
5: Islamorada	Mangrove Swamp	Red mangrove	60
		Black mangrove	30
6: Keylargo	Mangrove Swamp	Red mangrove	80
		Black mangrove	10
8*:			
Rock outcrop.			
Cudjoe	Mangrove Swamp	Black mangrove	50
		Red mangrove	10
		Saltwort	10
		Glasswort	10
9: Lignumvitae	Mangrove Swamp	Black mangrove	40
		Red mangrove	10
		White mangrove	10
		Buttonwood	10
		Glasswort	10
		Wild tamarind	5
12*:			
Rock outcrop.			
Cudjoe	Sawgrass Marsh	Sawgrass	40
		Buttonwood	10
		Locustberry	10
		White mangrove	5
		Poisonwood	5
		Seagrape	5
		Flameleaf sumac	5

See footnote at end of table.

TABLE 3.--CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Ecological community	Characteristic vegetation	Composition
			Pct
13 Keyvaca	Everglade Flatwoods	South Florida slash pine	25
		Locustberry	15
		Poisonwood	10
		Silver palm	10
		Satinleaf	5
		Threeawn	5
15 Cudjoe	Mangrove Swamp	Black mangrove	50
		Red mangrove	10
		Saltwort	10
		Glasswort	10
16 Bahiahonda	Coastal Strand	Poisonwood	15
		Crabwood	10
		Wild tamarind	10
		Buccaneer-palm	5
		Stopper	5
		Gumbo-limbo	5
		Deering's tree cactus	5
17 Keywest	Mangrove Swamp	Black mangrove	40
		Red mangrove	10
		White mangrove	10
		Buttonwood	10
		Glasswort	10
19 Saddlebunch	Tropical Hammocks	Wild tamarind	10
		Poisonwood	10
		Buttonwood	10
		White mangrove	10
		Mahogany	5
		Wild tamarind	5
		Crabwood	5
		Thatch palm	5
		Locustberry	5

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 4.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe")

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
2-----Pennekamp	Severe: flooding, excess humus, depth to rock.	Severe: excess humus, depth to rock.	Severe: excess humus, depth to rock.	Severe: excess humus.	Severe: depth to rock, excess humus.
3-----Matecumbe	Severe: flooding, depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Moderate: wetness.	Severe: depth to rock, excess humus.
4*:					
Rock outcrop-----	Severe: flooding, depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Moderate: flooding.	Severe: flooding, depth to rock.
Tavernier-----	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus, excess salt.	Severe: excess humus, wetness, flooding.	Severe: wetness, excess humus.	Severe: excess salt, wetness, flooding.
5-----Islamorada	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus, excess salt.	Severe: excess humus, wetness, flooding.	Severe: wetness, excess humus.	Severe: excess salt, wetness, flooding.
6-----Keylargo	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus, excess salt.	Severe: excess humus, wetness, flooding.	Severe: wetness, excess humus.	Severe: excess salt, wetness, flooding.
7*:					
Udorthents-----	Severe: flooding, small stones, too sandy.	Severe: too sandy, small stones.	Severe: small stones, too sandy.	Severe: too sandy, small stones.	Severe: small stones, large stones, droughty.
Urban land-----	Variable-----	Variable-----	Variable-----	Variable-----	Variable.
8*:					
Rock outcrop-----	Severe: flooding, depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Moderate: flooding.	Severe: flooding, depth to rock.
Cudjoe-----	Severe: flooding, wetness, depth to rock.	Severe: wetness, excess salt, depth to rock.	Severe: wetness, flooding, depth to rock.	Severe: wetness.	Severe: excess salt, wetness, flooding.
9-----Lignumvitae	Severe: flooding, wetness, excess salt.	Severe: wetness, excess salt.	Severe: wetness, flooding, excess salt.	Severe: wetness.	Severe: excess salt, wetness, flooding.
11*-----Urban land	Variable-----	Variable-----	Variable-----	Variable-----	Variable.

See footnote at end of table.

TABLE 4.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
12*:					
Rock outcrop	Severe: flooding, depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Moderate: flooding.	Severe: flooding, depth to rock.
Cudjoe	Severe: flooding, wetness, depth to rock.	Severe: wetness, excess salt, depth to rock.	Severe: wetness, flooding, depth to rock.	Severe: wetness.	Severe: excess salt, wetness, flooding.
13 Keyvaca	Severe: flooding, depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Slight	Severe: depth to rock.
15 Cudjoe	Severe: flooding, wetness, depth to rock.	Severe: wetness, excess salt, depth to rock.	Severe: wetness, flooding, depth to rock.	Severe: wetness.	Severe: excess salt, wetness, flooding.
16 Bahiahonda	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
17 Keywest	Severe: flooding, wetness, excess salt.	Severe: wetness, excess salt.	Severe: wetness, flooding, excess salt.	Severe: wetness.	Severe: excess salt, wetness, flooding.
18* Beaches	Severe: flooding, wetness, too sandy.	Severe: wetness, too sandy, excess salt.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy.	Severe: excess salt, wetness, droughty.
19 Saddlebunch	Severe: flooding, wetness, depth to rock.	Severe: wetness, excess salt, depth to rock.	Severe: wetness, depth to rock, excess salt.	Severe: wetness.	Severe: excess salt, wetness, depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 5.--WILDLIFE HABITAT

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements					Potential as habitat for--	
	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Woodland wildlife	Wetland wildlife
2: Pennekamp	Poor	Fair	Very poor.	Poor	Very poor.	Fair	Very poor.
3: Matecumbe	Poor	Fair	Very poor.	Poor	Very poor.	Fair	Very poor.
4*:							
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor	Very poor.
Tavernier	Very poor.	Very poor.	Very poor.	Poor	Good	Very poor	Fair.
5: Islamorada	Very poor.	Very poor.	Very poor.	Poor	Good	Very poor	Fair.
6: Keylargo	Very poor.	Very poor.	Very poor.	Poor	Good	Very poor	Fair.
7*:							
Udorthents.							
Urban land.							
8*:							
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor	Very poor.
Cudjoe	Very poor.	Very poor.	Very poor.	Poor	Good	Very poor	Fair.
9: Lignumvitae	Very poor.	Very poor.	Very poor.	Poor	Good	Very poor	Fair.
11*.							
Urban land							
12*:							
Rock outcrop	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor	Very poor.
Cudjoe	Poor	Poor	Very poor.	Poor	Good	Poor	Fair.
13: Keyvaca	Poor	Poor	Fair	Poor	Very poor.	Fair	Very poor.
15: Cudjoe	Very poor.	Very poor.	Very poor.	Poor	Good	Very poor	Fair.
16: Bahiahonda	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Very poor.
17: Keywest	Very poor.	Very poor.	Very poor.	Poor	Good	Very poor	Fair.

See footnote at end of table.

TABLE 5.--WILDLIFE HABITAT--Continued

Soil name and map symbol	Potential for habitat elements: Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Woodland wildlife	Wetland wildlife
18*----------------- Beaches	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor	Very poor.
19------------------ Saddlebunch	Poor	Fair	Very poor.	Fair	Good	Fair	Fair.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "moderate" and "severe." The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2: Pennekamp	Severe: flooding.	Severe: flooding.	Moderate: depth to rock, flooding.	Severe: depth to rock, excess humus.
3: Matecumbe	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: depth to rock, excess humus.
4*:				
Rock outcrop	Severe: flooding, depth to rock.	Severe: flooding, depth to rock.	Severe: depth to rock.	Severe: flooding, depth to rock.
Tavernier	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: excess salt, wetness, flooding.
5: Islamorada	Severe: subsides, flooding, wetness.	Severe: subsides, flooding, wetness.	Severe: subsides, wetness, flooding.	Severe: excess salt, wetness, flooding.
6: Keylargo	Severe: subsides, flooding, wetness.	Severe: subsides, flooding, wetness.	Severe: subsides, wetness, flooding.	Severe: excess salt, wetness, flooding.
7*:				
Udorthents	Severe: flooding.	Severe: flooding.	Moderate: wetness, flooding, large stones.	Severe: small stones, large stones, droughty.
Urban land	Variable	Variable	Variable	Variable.
8*:				
Rock outcrop	Severe: flooding, depth to rock.	Severe: flooding, depth to rock.	Severe: depth to rock.	Severe: flooding, depth to rock.
Cudjoe	Severe: flooding, wetness, low strength.	Severe: flooding, wetness, low strength.	Severe: wetness, flooding.	Severe: excess salt, wetness, flooding.
9: Lignumvitae	Severe: flooding, wetness, low strength.	Severe: flooding, wetness, low strength.	Severe: wetness, flooding.	Severe: excess salt, wetness, flooding.
11*: Urban land	Variable	Variable	Variable	Variable.

See footnote at end of table.

TABLE 6.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
12*:				
Rock outcrop-----	Severe: flooding, depth to rock.	Severe: flooding, depth to rock.	Severe: depth to rock.	Severe: flooding, depth to rock.
Cudjoe-----------	Severe: flooding, wetness, low strength.	Severe: flooding, wetness, low strength.	Severe: wetness, flooding.	Severe: excess salt, wetness, flooding.
13---------------- Keyvaca	Severe: flooding.	Severe: flooding.	Moderate: depth to rock, flooding.	Severe: depth to rock.
15---------------- Cudjoe	Severe: flooding, wetness, low strength.	Severe: flooding, wetness, low strength.	Severe: wetness, flooding.	Severe: excess salt, wetness, flooding.
16---------------- Bahiahonda	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: droughty.
17---------------- Keywest	Severe: flooding, wetness, low strength.	Severe: flooding, wetness, low strength.	Severe: wetness, flooding.	Severe: excess salt, wetness, flooding.
18*--------------- Beaches	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: excess salt, wetness, droughty.
19---------------- Saddlebunch	Severe: flooding, wetness, low strength.	Severe: flooding, wetness, low strength.	Severe: wetness, flooding.	Severe: excess salt, wetness, depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "severe," "poor," and other terms. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Area sanitary landfill	Daily cover for landfill
2. Pennekamp	Severe: depth to rock, wetness.	Severe: depth to rock.	Poor: depth to rock.
3. Matecumbe	Severe: flooding, depth to rock, wetness.	Severe: flooding, depth to rock, wetness.	Poor: depth to rock.
4*:			
Rock outcrop	Severe: flooding, depth to rock.	Severe: flooding, depth to rock.	Poor: depth to rock.
Tavernier	Severe: flooding, depth to rock, wetness.	Severe: flooding, depth to rock, wetness.	Poor: depth to rock, wetness, excess salt.
5. Islamorada	Severe: flooding, depth to rock, wetness.	Severe: flooding, depth to rock, seepage.	Poor: depth to rock, wetness, excess humus.
6. Keylargo	Severe: subsides, flooding, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness, excess humus, excess salt.
7*:			
Udorthents	Severe: wetness, poor filter.	Severe: seepage, wetness.	Fair: wetness.
Urban land	Variable	Variable	Variable.
8*:			
Rock outcrop	Severe: flooding, depth to rock.	Severe: flooding, depth to rock.	Poor: depth to rock.
Cudjoe	Severe: flooding, depth to rock, wetness.	Severe: flooding, depth to rock, wetness.	Poor: depth to rock, hard to pack, wetness.
9. Lignumvitae	Severe: flooding, depth to rock, wetness.	Severe: flooding, depth to rock, seepage.	Poor: depth to rock, hard to pack, wetness.
11*. Urban land	Variable	Variable	Variable.

See footnote at end of table.

TABLE 7.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Area sanitary landfill	Daily cover for landfill
12*:			
Rock outcrop-------	Severe: flooding, depth to rock.	Severe: flooding, depth to rock.	Poor: depth to rock.
Cudjoe-------------	Severe: flooding, depth to rock, wetness.	Severe: flooding, depth to rock, wetness.	Poor: depth to rock, hard to pack, wetness.
13------------------ Keyvaca	Severe: depth to rock, wetness.	Severe: depth to rock, wetness.	Poor: depth to rock.
15------------------ Cudjoe	Severe: flooding, depth to rock, wetness.	Severe: flooding, depth to rock, wetness.	Poor: depth to rock, hard to pack, wetness.
16------------------ Bahiahonda	Severe: wetness, poor filter.	Severe: seepage, wetness.	Poor: seepage, too sandy.
17------------------ Keywest	Severe: flooding, wetness.	Severe: flooding, seepage, wetness.	Poor: hard to pack, wetness, excess salt.
18*----------------- Beaches	Severe: flooding, wetness, poor filter.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
19------------------ Saddlebunch	Severe: flooding, depth to rock, wetness.	Severe: flooding, depth to rock, wetness.	Poor: depth to rock, hard to pack, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
2-------------- Pennekamp	0-3	Gravelly muck----	PT	A-8	0-5	---	---	---	---	---	---
	3-8	Very gravelly loam, very gravelly silt loam, extremely gravelly loam.	GM, GC, GM-GC, SM	A-1, A-2, A-4, A-6	0-20	45-75	20-50	18-45	16-40	10-26	NP-16
	8	Weathered bedrock	---	---	---	---	---	---	---	---	---
3-------------- Matecumbe	0-6	Muck, gravelly muck.	OL, OH	A-8	1-3	---	---	---	---	---	---
	6	Weathered bedrock	---	---	---	---	---	---	---	---	---
4*:											
Rock outcrop--	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Tavernier-----	0-8	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	8	Weathered bedrock	---	---	---	---	---	---	---	---	---
5-------------- Islamorada	0-35	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	35	Weathered bedrock	---	---	---	---	---	---	---	---	---
6-------------- Keylargo	0-70	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	70	Weathered bedrock	---	---	---	---	---	---	---	---	---
7*:											
Udorthents----	0-32	Extremely gravelly sand.	GP, GP-GM	A-1-a	5-35	10-35	10-30	10-25	2-12	---	NP
	32-60	Marl-------------	ML	A-4	---	100	100	95-99	85-95	<35	NP-5
Urban land----	0-6	Variable---------	---	---	---	---	---	---	---	---	---
8*:											
Rock outcrop--	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Cudjoe--------	0-16	Marl-------------	OH	A-5	0-2	98-100	95-100	90-100	85-99	<60	NP-5
	16	Weathered bedrock	---	---	---	---	---	---	---	---	---
9-------------- Lignumvitae	0-32	Marl-------------	OH	A-5	0-2	98-100	90-100	90-100	85-99	<60	NP-5
	32	Weathered bedrock	---	---	---	---	---	---	---	---	---
11*------------ Urban land	0-6	Variable---------	---	---	---	---	---	---	---	---	---
12*:											
Rock outcrop--	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Cudjoe--------	0-16	Marl-------------	OH	A-5	0-2	98-100	95-100	90-100	85-99	<60	NP-5
	16	Weathered bedrock	---	---	---	---	---	---	---	---	---
13------------- Keyvaca	0-4	Very gravelly loam.	GM, GC, GM-GC, SM	A-1-b, A-2-4, A-4	5-25	60-90	50-75	30-60	20-50	12-24	NP-10
	4	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 8.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
15-------------	0-16	Marl-------------	OH	A-5	0-2	98-100	95-100	90-100	85-99	<60	NP-5
Cudjoe	16	Weathered bedrock	---	---	---	---	---	---	---	---	---
16-------------	0-8	Fine sand--------	SP, SP-SM	A-3	0	95-100	90-100	80-90	2-7	---	NP
Bahiahonda	8-68	Sand, fine sand	SP, SP-SM	A-3	0	95-100	90-100	80-90	2-7	---	NP
	68-82	Gravelly sand, very gravelly sand.	SP, GP	A-1-b, A-2-4, A-3	0	50-80	30-60	30-60	2-4	---	NP
	82	Weathered bedrock	---	---	---	---	---	---	---	---	---
17-------------	0-9	Marl-------------	OH	A-5	0-2	98-100	90-100	90-100	85-99	<60	NP-5
Keywest	9-15	Muck-------------	PT	A-8	---	---	---	---	---	---	---
	15-27	Mucky marl-------	OL	A-4	0	98-100	95-100	90-100	85-99	---	NP
	27-65	Marl-------------	OH	A-5	0-2	98-100	90-100	90-100	85-99	<60	NP-5
	65	Weathered bedrock	---	---	---	---	---	---	---	---	---
18*------------	0-6	Sand-------------	SP	A-1, A-3	0	100	75-100	5-85	0-5	---	NP
Beaches	6-60	Coarse sand, sand, fine sand.	SP	A-1, A-3	0	100	75-100	5-85	0-5	---	NP
19-------------	0-17	Marl-------------	OH	A-5	0-2	98-100	90-100	90-100	85-99	<60	NP-5
Saddlebunch	17	Weathered bedrock	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink- swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				Pct
2---------------- Pennekamp	0-3	---	0.40-0.60	2.0-6.0	0.15-0.20	5.6-6.5	2-4	Low--------	----	---	40-70
	3-8	5-10	1.35-1.55	2.0-6.0	0.07-0.16	7.4-8.4	2-4	Low--------	0.10		
	8	---	---	2.0-20.0	---	---	---	-----------	----		
3---------------- Matecumbe	0-6	2-7	0.30-0.60	6.0-20.0	0.16-0.20	5.6-7.3	4-8	Low--------	----	---	80-90
	6	---	---	2.0-20.0	---	---	---	-----------	----		
4*:											
Rock outcrop----	0-60	---	---	---	---	---	<2	-----------	----	---	---
Tavernier-------	0-8	---	0.20-0.30	6.0-20	0.20-0.25	6.1-7.8	>16	Low--------	----	---	70-85
	8	---	---	2.0-20.0	---	---	---	-----------	----		
5---------------- Islamorada	0-35	---	0.20-0.30	6.0-20.0	0.20-0.25	6.1-7.8	>16	Low--------	----	---	75-90
	35	---	---	2.0-20.0	---	---	---	-----------	----		
6---------------- Keylargo	0-70	---	0.20-0.30	6.0-20	0.20-0.25	6.1-7.8	>16	Low--------	----	---	75-90
	70	---	---	2.0-20.0	---	---	---	-----------	----		
7*:											
Udorthents------	0-32	1-5	1.35-1.50	6.0-20	0.01-0.03	7.4-8.4	2-4	Low--------	0.02	5	1-2
	32-60	5-25	0.90-1.20	0.6-6.0	0.15-0.20	6.6-8.4	4-8	Low--------	0.32		
Urban land------	0-6	---	---	---	---	---	<2	-----------	----	---	---
8*:											
Rock outcrop----	0-60	---	---	---	---	---	<2	-----------	----	---	---
Cudjoe----------	0-16	11-28	0.90-1.20	0.6-6.0	0.15-0.20	6.6-8.4	>16	Low--------	0.32	1	1-5
	16	---	---	2.0-20.0	---	---	---	-----------	----		
9---------------- Lignumvitae	0-32	11-28	0.90-1.20	0.6-6.0	0.15-0.20	6.6-8.4	>16	Low--------	0.32	2	1-5
	32	---	---	2.0-20.0	---	---	---	-----------	----		
11*-------------- Urban land	0-6	---	---	---	---	---	<2	-----------	----	---	---
12*:											
Rock outcrop----	0-60	---	---	---	---	---	<2	-----------	----	---	---
Cudjoe----------	0-16	11-28	0.90-1.20	0.6-6.0	0.15-0.20	6.6-8.4	>16	Low--------	0.32	1	1-5
	16	---	---	2.0-20.0	---	---	---	-----------	----		
13--------------- Keyvaca	0-4	3-8	1.40-1.60	2.0-6.0	0.05-0.12	7.4-8.4	2-4	Low--------	0.05	1	2-6
	4	---	---	2.0-20.0	---	---	---	-----------	----		
15--------------- Cudjoe	0-16	11-28	0.90-1.20	0.6-6.0	0.15-0.20	6.6-8.4	>16	Low--------	0.32	1	1-5
	16	---	---	2.0-20.0	---	---	---	-----------	----		
16--------------- Bahiahonda	0-8	1-5	1.40-1.60	6.0-20	0.04-0.08	6.6-7.8	4-8	Low--------	0.05	5	1-3
	8-68	1-5	1.50-1.70	6.0-20	0.04-0.08	6.6-7.8	4-8	Low--------	0.05		
	68-82	1-3	1.40-1.60	>20	0.02-0.05	7.4-8.4	4-8	Low--------	0.02		
	82	---	---	2.0-20.0	---	---	---	-----------	----		

See footnote at end of table.

TABLE 9.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH	mmhos/cm				Pct
17---------------- Keywest	0-9	11-28	0.90-1.20	0.6-6.0	0.15-0.20	6.6-8.4	>16	Low--------	0.32	4	1-5
	9-15	0-2	0.10-0.40	6.0-20	0.20-0.25	6.1-7.8	>16	Low--------	0.05		
	15-27	7-17	0.70-1.00	2.0-6.0	0.20-0.25	6.6-8.4	>16	Low--------	0.28		
	27-65	11-28	0.90-1.20	0.6-6.0	0.15-0.20	6.6-8.4	>16	Low--------	0.32		
	65	---	---	2.0-20.0	---	---	---	-----------	----		
18*--------------- Beaches	0-6	0-1	1.35-1.85	>6.0	0.03-0.05	5.1-7.8	>4	Low--------	0.05	5	<.1
	6-60	0-1	1.35-1.85	>6.0	0.03-0.05	5.1-7.8	>4	Low--------	0.05		
19---------------- Saddlebunch	0-17	11-28	0.90-1.20	0.6-6.0	0.15-0.20	6.6-8.4	8-16	Low--------	0.32	1	1-5
	17	---	---	2.0-20.0	---	---	---	-----------	----		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SOIL AND WATER FEATURES

("Flooding" and "water table" and terms such as "rare," "brief," and "apparent" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Subsidence: Initial	Subsidence: Total	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In		In	In		
2----------------- Pennekamp	D	Rare---------	---	---	3.5-5.0	Apparent	Jun-Nov	4-16	Soft	1-4	3-8	Moderate	Moderate.
3----------------- Matecumbe	D	Occasional	Brief-----	Jul-Dec	1.5-3.0	Apparent	Jul-Dec	2-9	Soft	1-3	5-9	Moderate	Low.
4*:													
Rock outcrop-----	D	Frequent----	---	---	>6.0	---	---	0	Hard	---	---	---	---
Tavernier---------	D	Frequent----	Very long	Jan-Dec	0	Apparent	Jan-Dec	3-20	Soft	1-7	2-14	High-----	High.
5----------------- Islamorada	D	Frequent----	Very long	Jan-Dec	0	Apparent	Jan-Dec	20-50	Soft	7-17	13-33	High-----	High.
6----------------- Keylargo	D	Frequent----	Very long	Jan-Dec	0	Apparent	Jan-Dec	50-90	Soft	17-30	33-60	High-----	High.
7*:													
Udorthents-------	B	Rare---------	---	---	2.0-4.0	Apparent	Jan-Dec	60-90	Soft	---	---	Moderate	Low.
Urban land-------	D	Rare---------	---	---	>2.0	---	---	>10	---	---	---	---	---
8*:													
Rock outcrop-----	D	Frequent----	---	---	>6.0	---	---	0	Hard	---	---	---	---
Cudjoe-----------	D	Frequent----	Long------	Jan-Dec	0-0.5	Apparent	Jan-Dec	3-20	Soft	---	---	High-----	Low.
9----------------- Lignumvitae	D	Frequent----	Long------	Jan-Dec	0-0.5	Apparent	Jan-Dec	20-40	Soft	---	---	High-----	Low.
11*--------------- Urban land	D	Rare---------	---	---	>2.0	---	---	>10	---	---	---	---	---
12*:													
Rock outcrop-----	D	Frequent----	---	---	>6.0	---	---	0	Hard	---	---	---	---
Cudjoe-----------	D	Frequent----	Brief-----	Jan-Dec	0-0.5	Apparent	Jan-Dec	3-20	Soft	---	---	High-----	Low.
13---------------- Keyvaca	D	Rare---------	---	---	3.0-5.0	Apparent	Jun-Nov	3-6	Soft	---	---	Moderate	Moderate.
15---------------- Cudjoe	D	Frequent----	Long------	Jan-Dec	0-0.5	Apparent	Jan-Dec	3-20	Soft	---	---	High-----	Low.

See footnote at end of table.

TABLE 10.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro- logic group	Flooding			High water table			Bedrock		Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard- ness	Ini- tial	Total	Uncoated steel	Concrete
					Ft			In		In	In		
16----------------- Bahiahonda	B	Rare---------	---	---	2.5-3.5	Apparent	Jun-Nov	60-90	Soft	---	---	Moderate	Low.
17----------------- Keywest	D	Frequent----	Long------	Jan-Dec	0-0.5	Apparent	Jan-Dec	40-90	Soft	---	---	High-----	Low.
18*---------------- Beaches	D	Frequent----	Long------	Jan-Dec	0-6.0	Apparent	Jan-Dec	>60	---	---	---	High-----	High.
19----------------- Saddlebunch	D	Occasional	Long------	Jun-Nov	0.5-1.0	Apparent	Jun-Nov	4-20	Soft	---	---	High-----	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Bahiahonda	Isohyperthermic, uncoated Aquic Quartzipsamments
Cudjoe	Loamy, carbonatic, isohyperthermic, shallow Tropic Fluvaquents
Islamorada	Euic, isohyperthermic Lithic Troposaprists
Keylargo	Euic, isohyperthermic Typic Troposaprists
Keyvaca	Loamy-skeletal, carbonatic, isohyperthermic Lithic Rendolls
Keywest	Coarse-silty, carbonatic, isohyperthermic Thapto-Histic Tropic Fluvaquents
Lignumvitae	Coarse-silty, carbonatic, isohyperthermic Tropic Fluvaquents
Matecumbe	Euic, isohyperthermic Lithic Tropofolists
Pennekamp	Loamy-skeletal, carbonatic, isohyperthermic Lithic Rendolls
Saddlebunch	Loamy, carbonatic, isohyperthermic, shallow Tropic Fluvaquents
Tavernier	Euic, isohyperthermic, shallow Lithic Troposaprists
Udorthents	Udorthents

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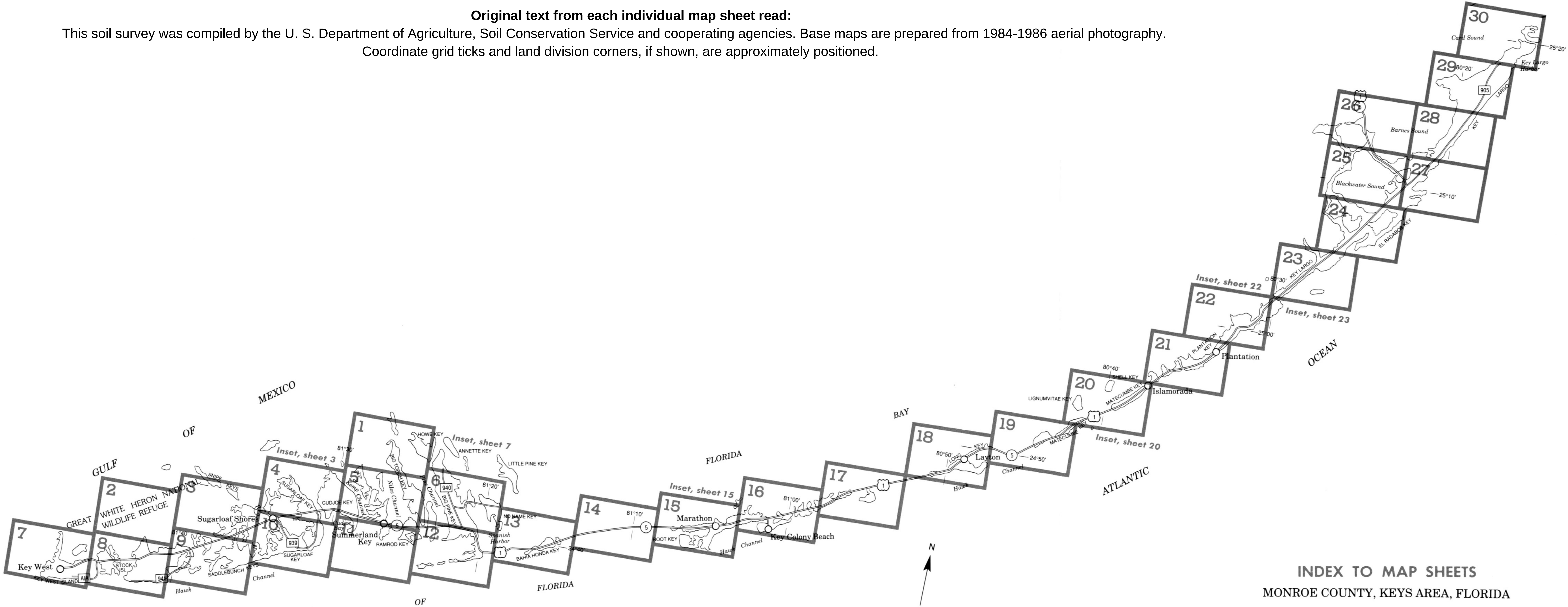
Original text from each individual map sheet read:

This soil survey was compiled by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Base maps are prepared from 1984-1986 aerial photography.

Coordinate grid ticks and land division corners, if shown, are approximately positioned.



SOIL LEGEND

Map unit names without a slope range have 0 to 1 percent slopes. If the map unit name includes tidal, the unit is frequently flooded by tides. If the map unit name does not include a reference to flooding, it is rarely flooded. Beaches are subject to shallow flooding by tides or to deep flooding from hurricanes and other tropical storms.

SYMBOL	NAME
2	Pennekamp gravelly muck, 0 to 2 percent slopes, extremely stony
3	Matecumbe muck, occasionally flooded
4	Rock outcrop, Tavernier complex, tidal
5	Islamorada muck, tidal
6	Keylargo muck, tidal
7	Udorthents-Urban land complex
8	Rock outcrop-Cudjoe complex, tidal
9	Lignumvitae marl, tidal
11	Urban land
12	Rock outcrop-Cudjoe complex, frequently flooded
13	Keyvaca very gravelly loam, extremely stony
15	Cudjoe marl, tidal
16	Bahiahonda fine sand, 0 to 3 percent slopes
17	Keywest marl, tidal
18	Beaches
19	Saddlebunch marl, occasionally flooded

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES
- National, state, or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label)
- Small airport, airfield, park, oilfield, cemetery, or flood pool

STATE COORDINATE TICK
1 890 000 FEET

LAND DIVISION CORNER
(sections and land grants)

ROADS
- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS
- Interstate
- Federal
- State
- County

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES
- Without road
- With road
- With railroad

DAMS
- Large (to scale)
- Medium or Small (Named where applicable)

PITS
- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES
- Farmstead, house (omit in urban area) (occupied)
- Church
- School
- Indian mound (label)
- Located object (label)
- Tank (label)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE
- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS
- Perennial
- Intermittent

MISCELLANEOUS WATER FEATURES
- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS

ESCARPMENTS
- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

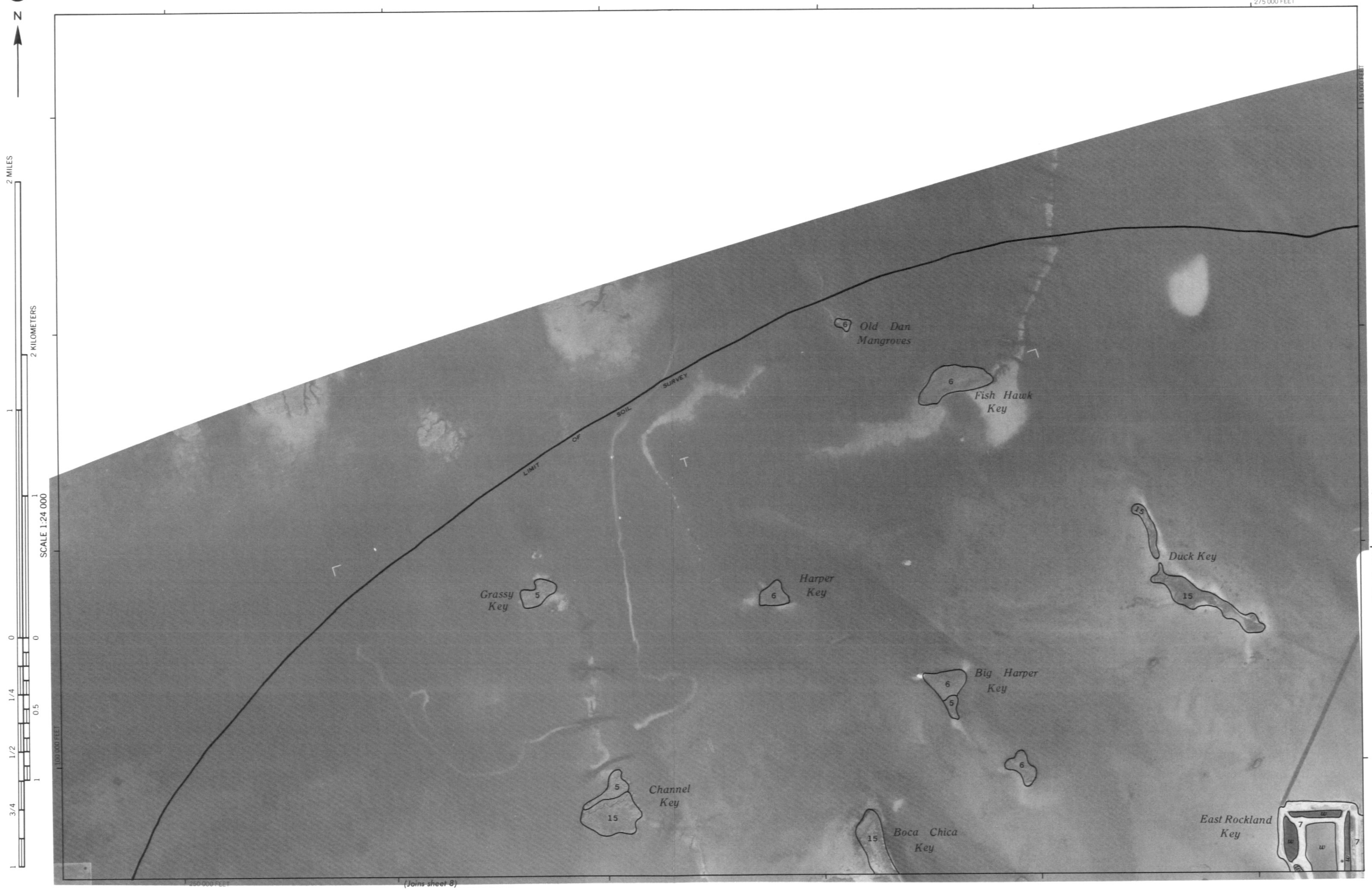
DEPRESSION OR SINK

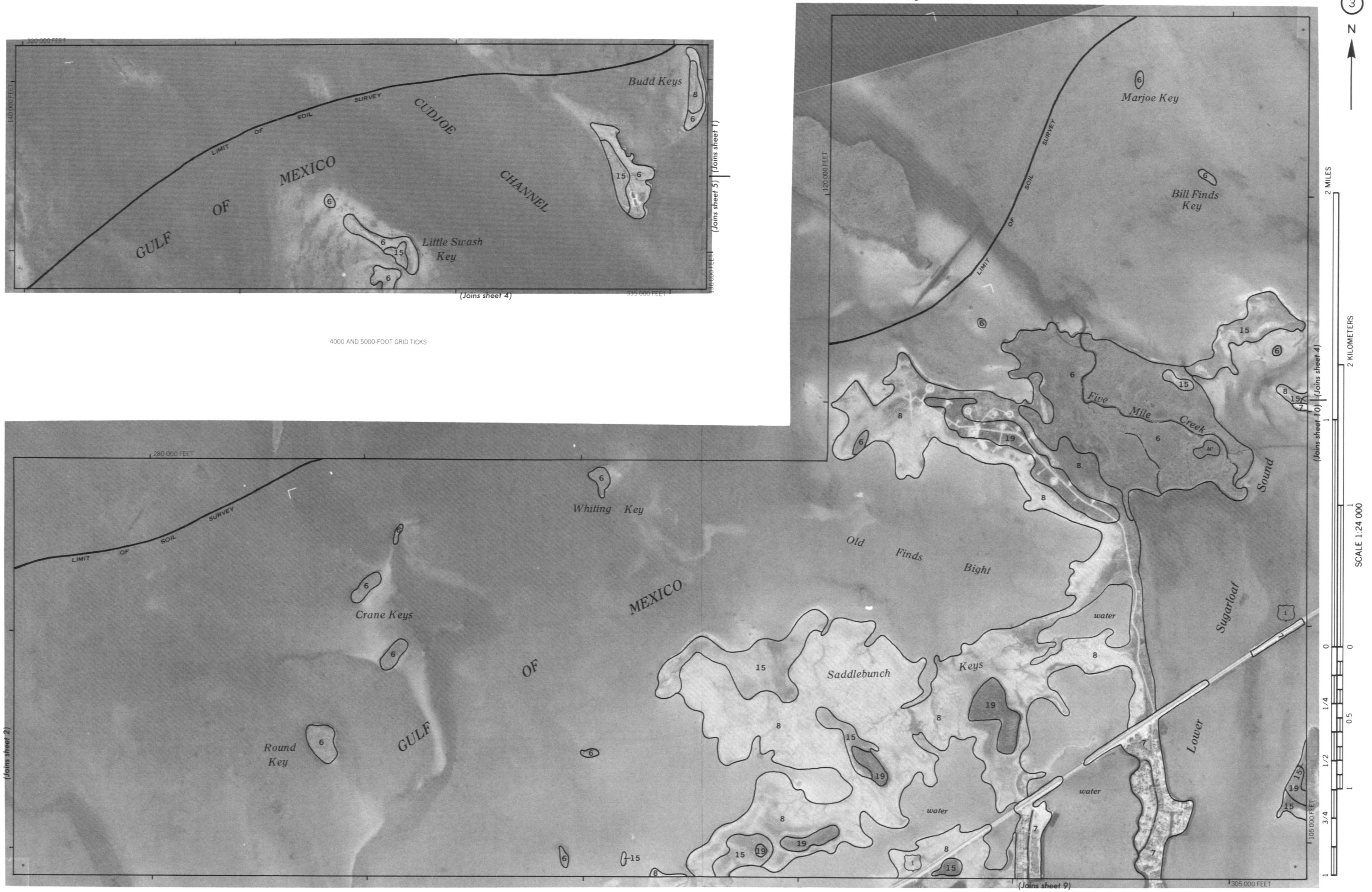
SOIL SAMPLE (normally not shown)

MISCELLANEOUS
- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot


1
N
Torch Key
Mangroves
Big Torch Key
Knockem Down Key
LIMIT OF SOIL SURVEY
340 000 FEET
155 000 FEET
365 000 FEET
(Joins inset, sheet 3)
(Joins sheet 5)
(Joins sheet 6)
2 MILES
2 KILOMETERS
SCALE 1:24 000

SOIL SURVEY OF MONROE COUNTY KEYS, FLORIDA — SHEET NUMBER 2




3
N
GULF OF MEXICO
CUDJOE CHANNEL
LIMIT OF SOIL SURVEY
Budd Keys
Little Swash Key
(Joins sheet 1)
(Joins sheet 5)
(Joins sheet 4)
4000 AND 5000-FOOT GRID TICKS
Marjoe Key
Bill Finds Key
Five Mile Creek
Sound
Old Finds Bight
Sugarloaf
Lower
Saddlebunch Keys
water
Whiting Key
Crane Keys
Round Key
(Joins sheet 2)
(Joins sheet 9)
(Joins sheet 10)
2 MILES
2 KILOMETERS
SCALE 1:24 000


N
2 MILES
2 KILOMETERS
SCALE 1:24 000
(Joins inset, sheet 3)
(Joins sheet 3)
(Joins sheet 5)
(Joins sheet 11)
(Joins sheet 10)
335 000 FEET
135 000 FEET
120 000 FEET
310 000 FEET
LIMIT OF SOIL SURVEY
Rattlesnake Lumps
Sugarloaf Key
Douglas Key
Dreguef Key
UPPER SUGARLOAF SOUND
Park Key
Sugarloaf Channel
Cudjoe Key
water


5
N
(Joins sheet 1)
(Joins sheet 11)
(Joins sheet 4) | (Joins inset, sheet 3)
(Joins sheet 12) | (Joins sheet 6)
346 000 FEET
365 000 FEET
135 000 FEET
120 000 FEET
Knockem Down Key
Little Knockem Down Key
Toptree Hammock Key
Big Torch Key
Middle Torch Key
Howell Key
Niles Channel
Summerland Key
Kemp Channel
YUKEY
Torch Ramrod Channel
Ramrod Key
water
SCALE 1:24 000
2 MILES
2 KILOMETERS


6
N
(Joins inset, sheet 7)
(Joins sheet 5)
(Joins sheet 1)
(Joins sheet 13)
(Joins sheet 12)
395 000 FEET
140 000 FEET
370 000 FEET
120 000 FEET
2 MILES
2 KILOMETERS
SCALE 1:24 000
Big Pine Key
Bogie Channel
Doctors Arm
No Name Key
Refuge Key
Big Mangrove Key
Pine Channel
Little Torch Key
Middle Torch Key


7
N
Channel
Garrison
Bight
Fleming
Key
Man of War
Harbor
LIMIT OF SOIL SURVEY
water
Wisteria
Island
Salt Pond
Keys
Key West
Bight
Garrison
Bight
Malloey
Dock
KEY WEST
DUVAL
STREET
(Joins sheet 8)
(Joins sheet 1)
(Joins sheet 6)
Big
Pine
Key
2 MILES
2 KILOMETERS
SCALE 1:24 000
1
3/4
1/2
1/4
0
0.5
0
1


8
N
(Joins sheet 2)
(Joins sheet 7)
(Joins sheet 9)
LIMIT OF SOIL SURVEY
275 000 FEET
250 000 FEET
95 000 FEET
2 MILES
2 KILOMETERS
SCALE 1:24 000
KEY WEST
Raccoon Key
Monday Key
State Harbor
Cow Key
Boca Chica Channel
Boca Chica Key
East Rockland Key
Geiger Creek
US NAVAL AIR STATION
water


9
N
(Joins sheet 3)
(Joins sheet 2)
(Joins sheet 8)
(Joins sheet 10)
Halfmoon Key
Shark Key
Ohara Key
Shark Channel
Saddlebunch Keys
SOUND
SEMILAR
Big Coppitt Key
Bird Key
Saddlebunch Harbor
Geiger Key
Saddlehill Key
Pelican Key
water
SCALE 1:24 000
2 MILES
2 KILOMETERS
280 000 FEET
100 000 FEET
305 000 FEET


N
2 MILES
2 KILOMETERS
SCALE 1:24 000
(Joins sheet 4)
(Joins sheet 3)
(Joins sheet 9)
(Joins sheet 11)
335 000 FEET
115 000 FEET
100 000 FEET
310 000 FEET
Upper Sugarloaf Sound
Lower Sugarloaf Sound
Sugarloaf Key
Sugarloaf Creek
water

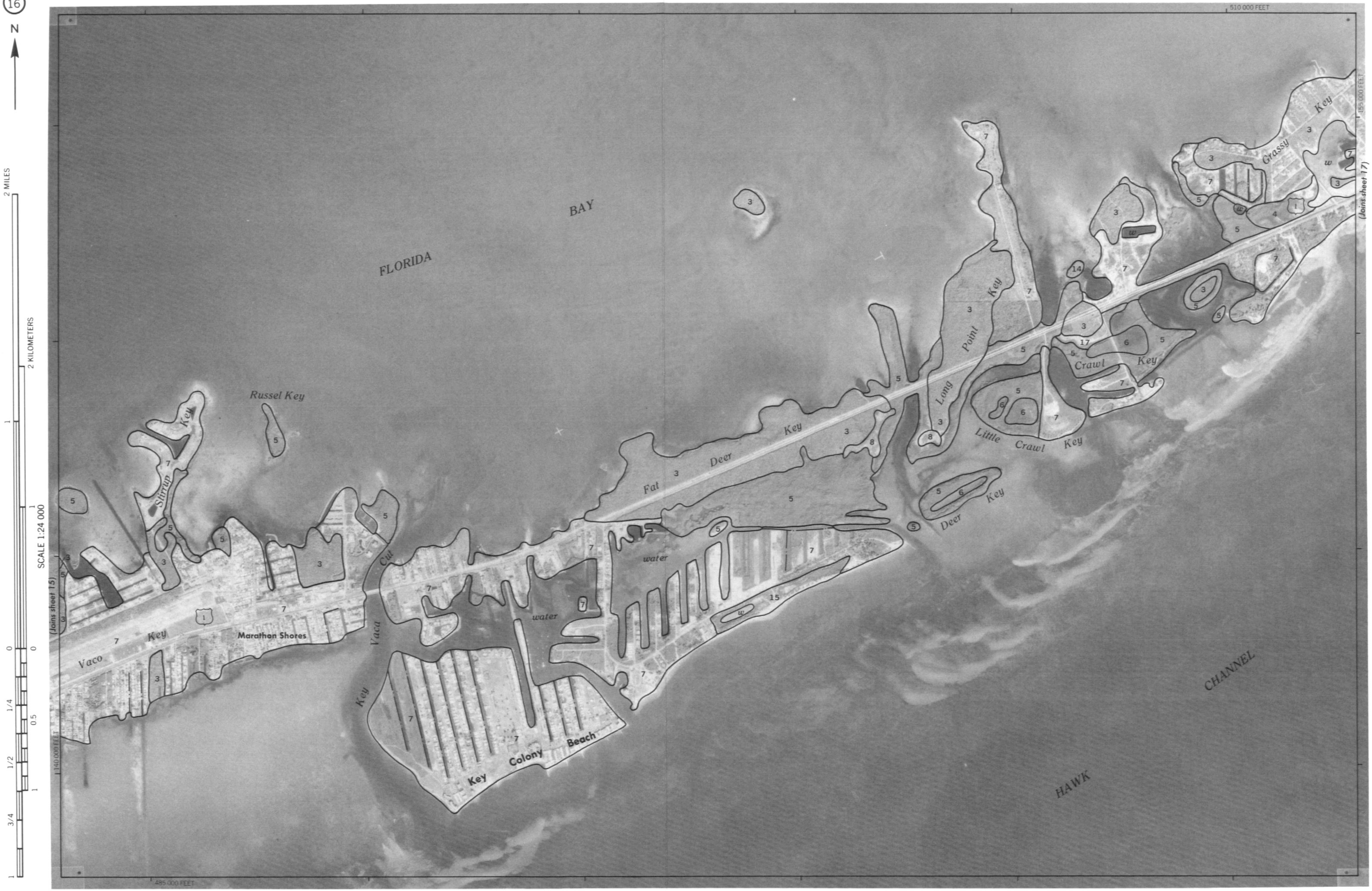

11
N
(Joins sheet 5)
(Joins sheet 4)
(Joins sheet 10)
(Joins sheet 12)
340 000 FEET
115 000 FEET
100 000 FEET
365 000 FEET
CUDJOE
BAY
Cudjoe
Key
Kemp
Channel
Gopher
Key
Monkey
Key
Crab Key
Summerland
Key
Niles
Channel
Ramrod
Key
water
Pye
Key
SCALE 1:24 000
2 MILES
1
0
1/4
1/2
3/4
2 KILOMETERS
1
0.5
0


12
N
(Joins sheet 6)
(Joins sheet 5)
(Joins sheet 11)
(Joins sheet 13)
Ramrod
Torch
Torch Channel
Little Torch Key
South Pine Channel
North Pine Channel
Ramrod Key
Big Mangrove Key
Spanish Harbor
Coupon Bight
Channel
Harbor
Newfound Harbor
Newfound Harbor Keys
Cooks Island
Big Munson Island
Long Beach
HAWK CHANNEL
SCALE 1:24 000
2 MILES
2 KILOMETERS
395 000 FEET
120 000 FEET
105 000 FEET
380 000 FEET


13
N
395 000 FEET
420 000 FEET
115 000 FEET
(Joins sheet 12)
(Joins sheet 6)
(Joins sheet 14)
FLORIDA
BAY
No Name Key
Don Quixote Key
Bahia Honda Channel
West Summerland Key
Bahia Honda Key
Ohio Bahia Honda Channel
Otto Key
Ohio Missouri Channel
Missouri Key
Little Duck Channel
Little Duck Key
Little Monkey Key
HAWK CHANNEL
water
2 MILES
2 KILOMETERS
SCALE 1:24 000

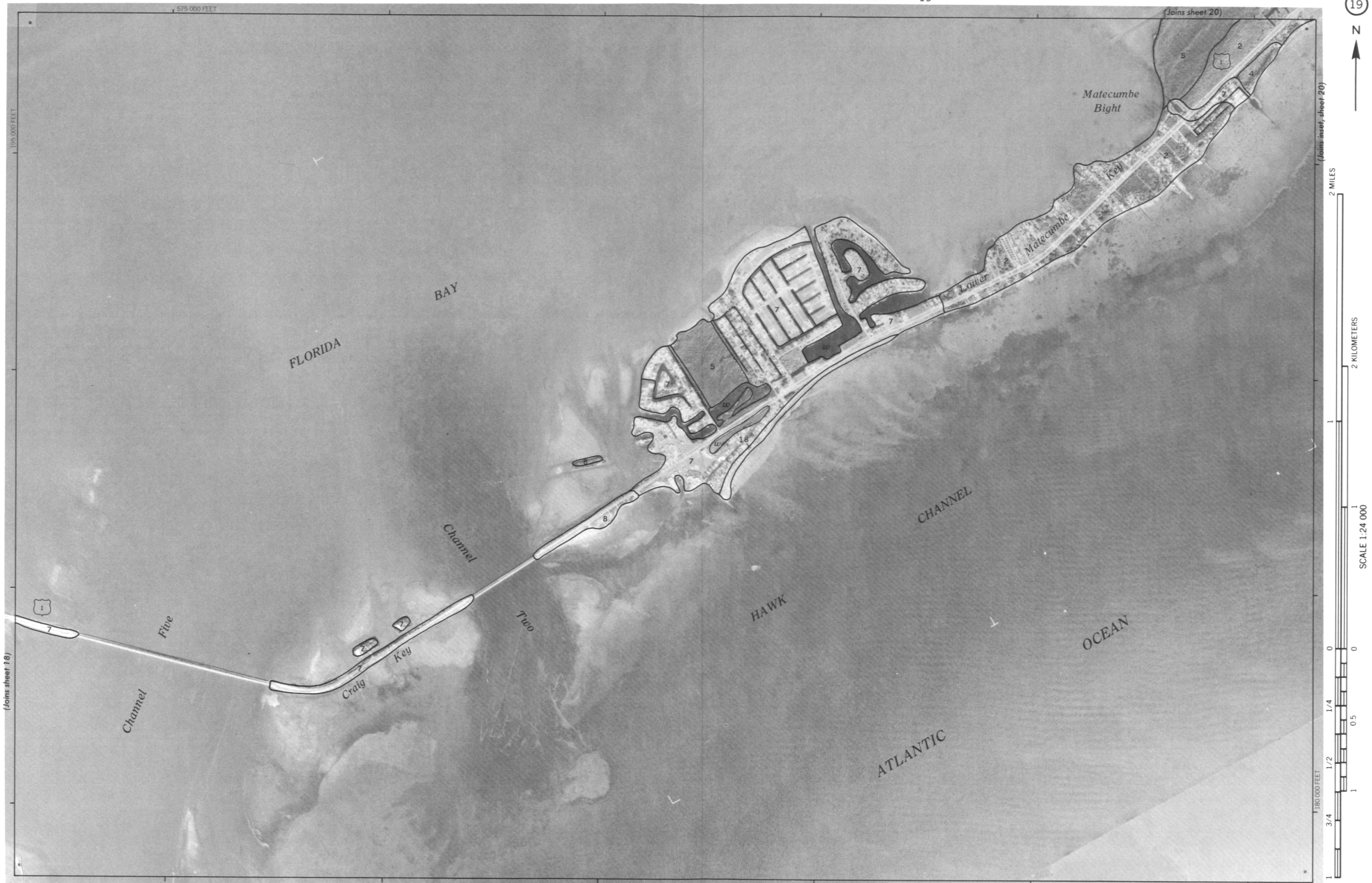

14
N
2 MILES
2 KILOMETERS
1
SCALE 1:24 000
0
1/4
0.5
1/2
3/4
450 000 FEET
140 000 FEET
125 000 FEET
425 000 FEET
(Joins sheet 13)
(Joins sheet 15)
FLORIDA
BAY
Channel
Pigeon Key
Moser
Seven
Mile
Bridge
Monkey
Key
Packet
Little Monkey
Key
Channel
Monkey Key
Channel
Malasses Key
CHANNEL
HAWK

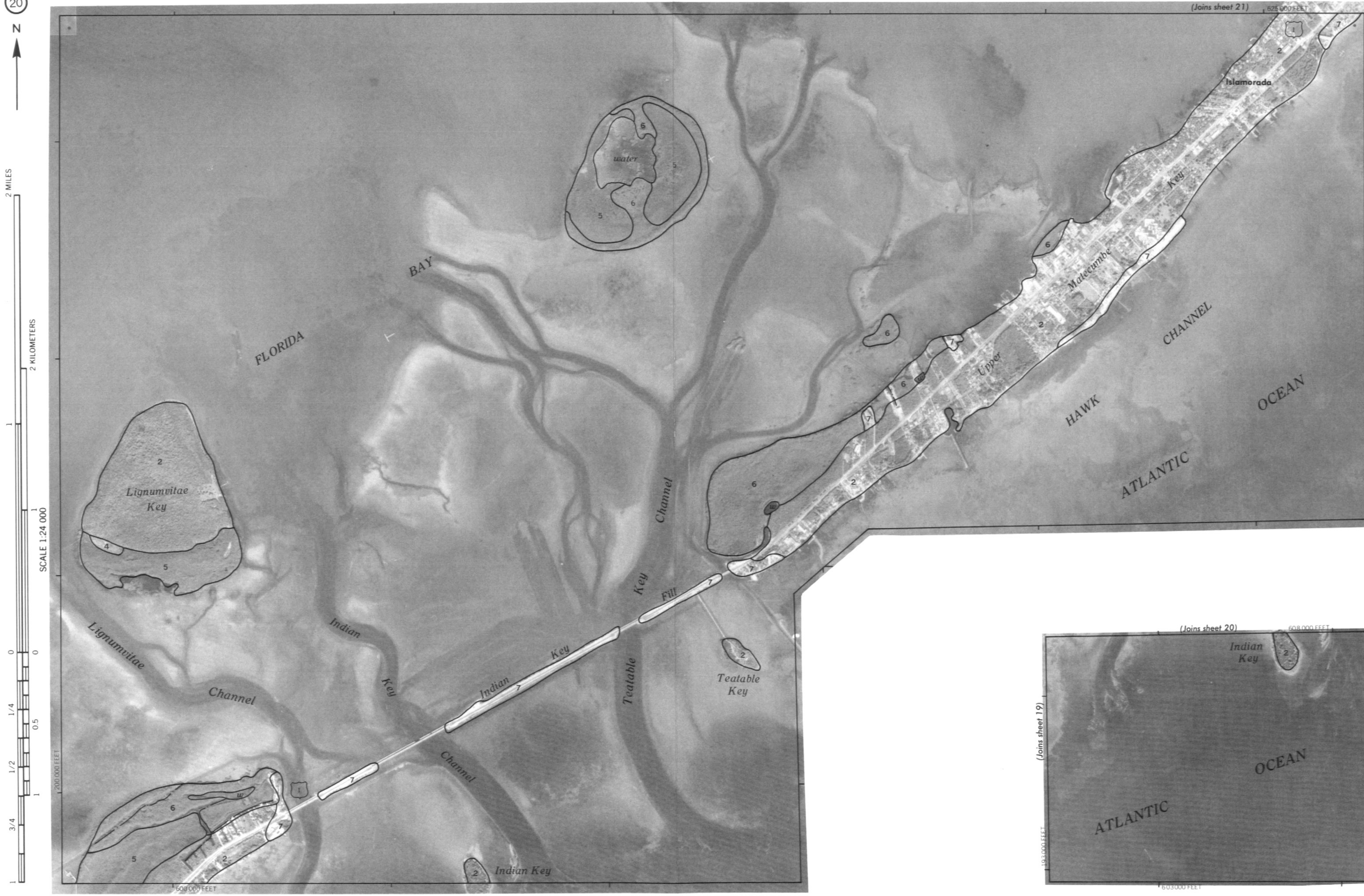

15
N
Rachel Key
Fanny Keys
Palm Island
Marathon
Vaca Key
Boot Key Harbor
Vaca Key Bight
Sister Creek
Boot Key
water
(Joins sheet 14)
(Joins sheet 16)
455 000 FEET
145 000 FEET
480 000 FEET
130 000 FEET
2 MILES
2 KILOMETERS
SCALE 1:24 000
0
1/4
1/2
3/4
1
0.5


N
2 MILES
2 KILOMETERS
SCALE 1:24 000
1
1
0
0
1/4
0.5
1/2
1
3/4
1
510 000 FEET
485 000 FEET
140 000 FEET
155 000 FEET
(Joins sheet 15)
(Joins sheet 17)
FLORIDA
BAY
HAWK
CHANNEL
Russel Key
Stirrup Key
Vaco Key
Marathon Shores
Vaca Cut
Key Vaca
Key Colony Beach
Fat Deer Key
Long Point Key
Little Crawl Key
Crawl Key
Deer Key
Grassy Key
water
water
1
1
3
5
6
7
8
14
15
17
w


17
N
515 000 FEET
540 000 FEET
(Joins sheet 16)
FLORIDA
BAY
Channel Key
Conch Key
Walker Island
Toms Harbor Channel
Toms Harbor Cut
Toms Harbor Keys
Duck Key Channel
Duck Key
Grassy Key
HAWK CHANNEL
1
2 MILES
2 KILOMETERS
SCALE 1:24 000
0
1/4
1/2
3/4
0.5

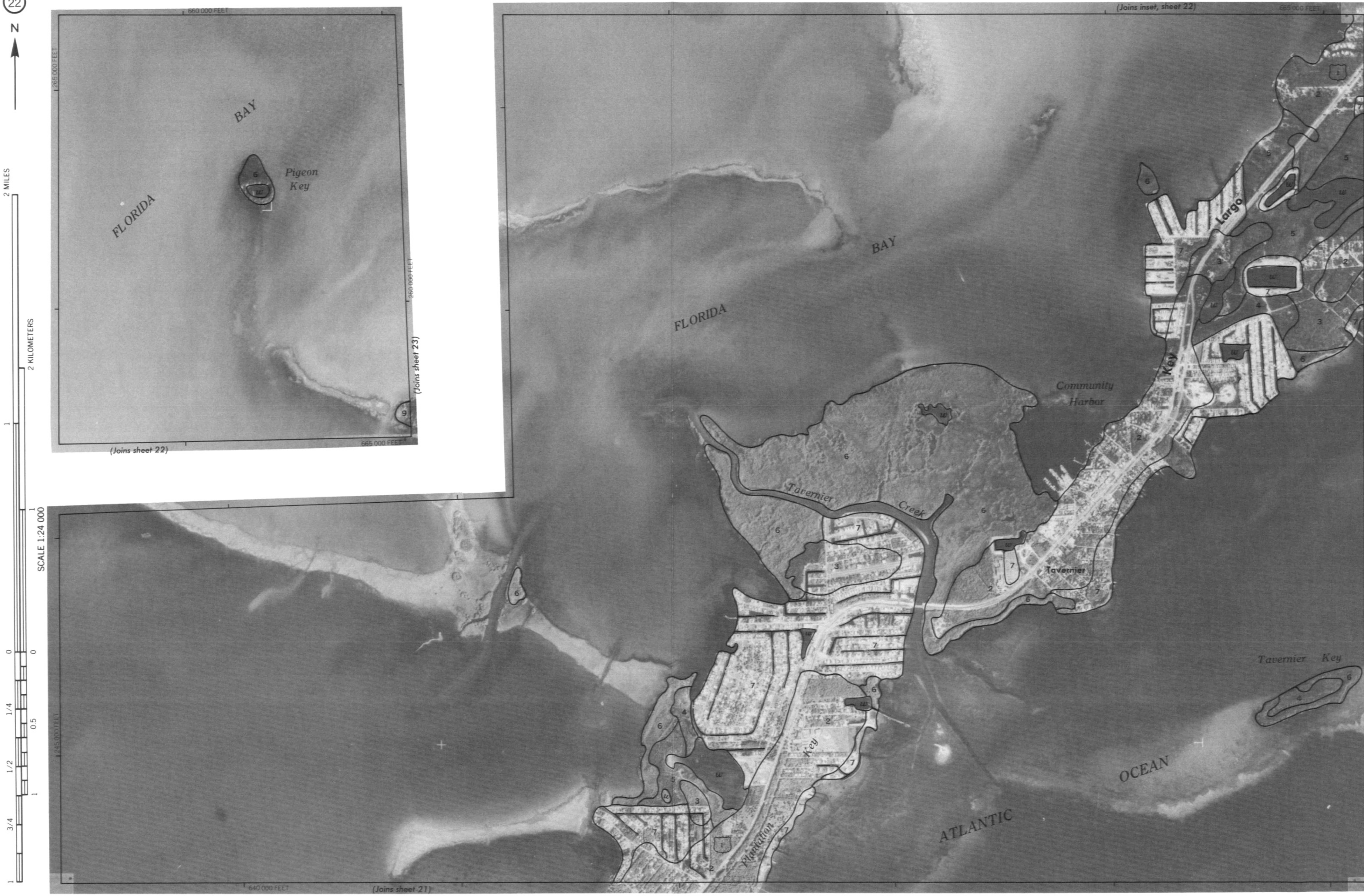

N
2 MILES
2 KILOMETERS
SCALE 1:24 000
FLORIDA
BAY
Fiesta Key
Long Key
Bight
Layton
water
Long
Key
HAWK
CHANNEL
(Joins sheet 19)
570 000 FEET
185 000 FEET
545 000 FEET
170 000 FEET

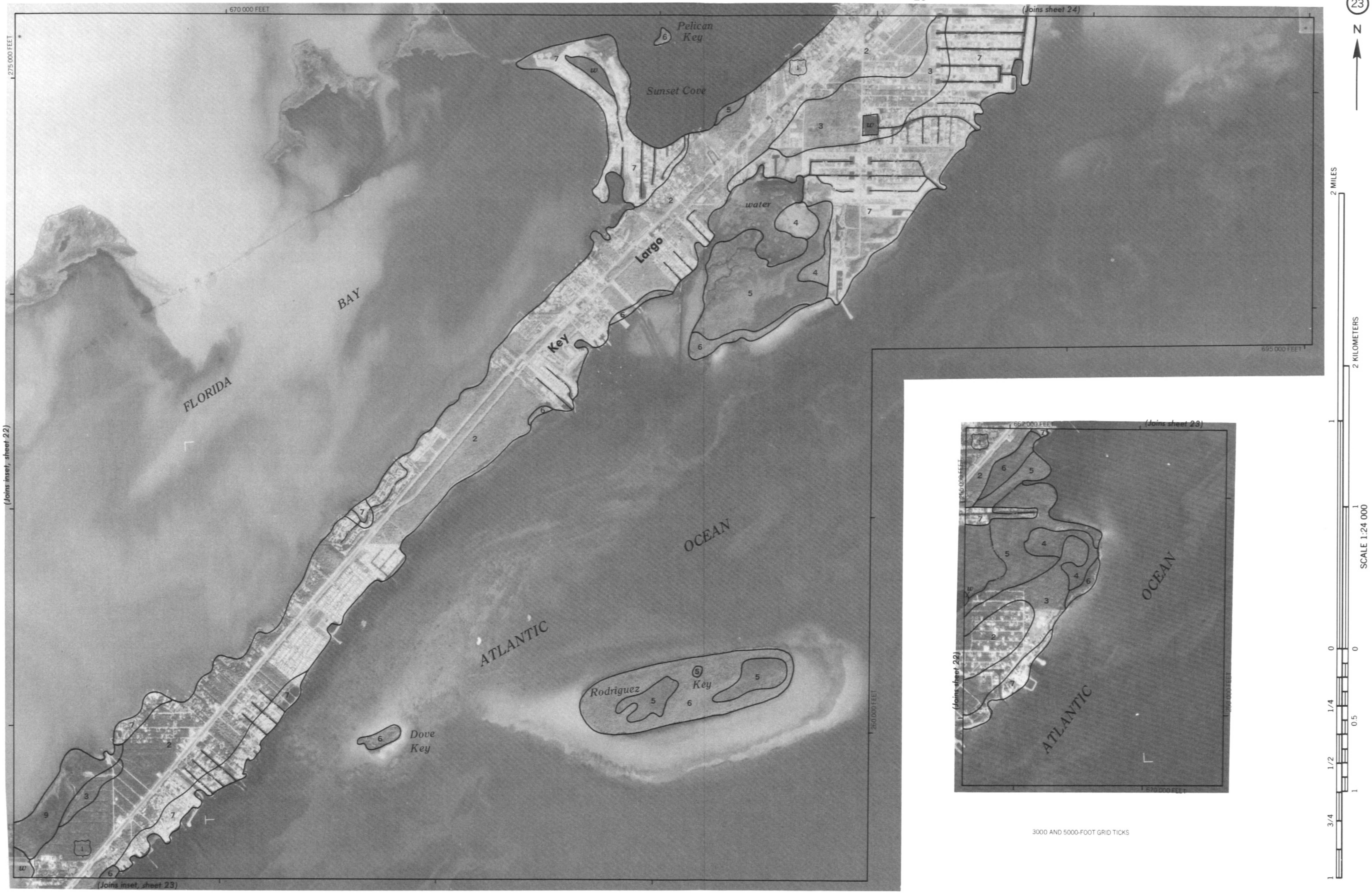

19
N
575 000 FEET
195 000 FEET
(Joins sheet 20)
(Joins inset, sheet 20)
(Joins sheet 18)
Matecumbe
Bight
Lower
Matecumbe
Key
FLORIDA
BAY
Channel
Two
Channel
Five
Craig
Key
HAWK
CHANNEL
ATLANTIC
OCEAN
180 000 FEET
600 000 FEET
2 MILES
2 KILOMETERS
SCALE 1:24 000



4000 AND 5000-FOOT GRID TICKS

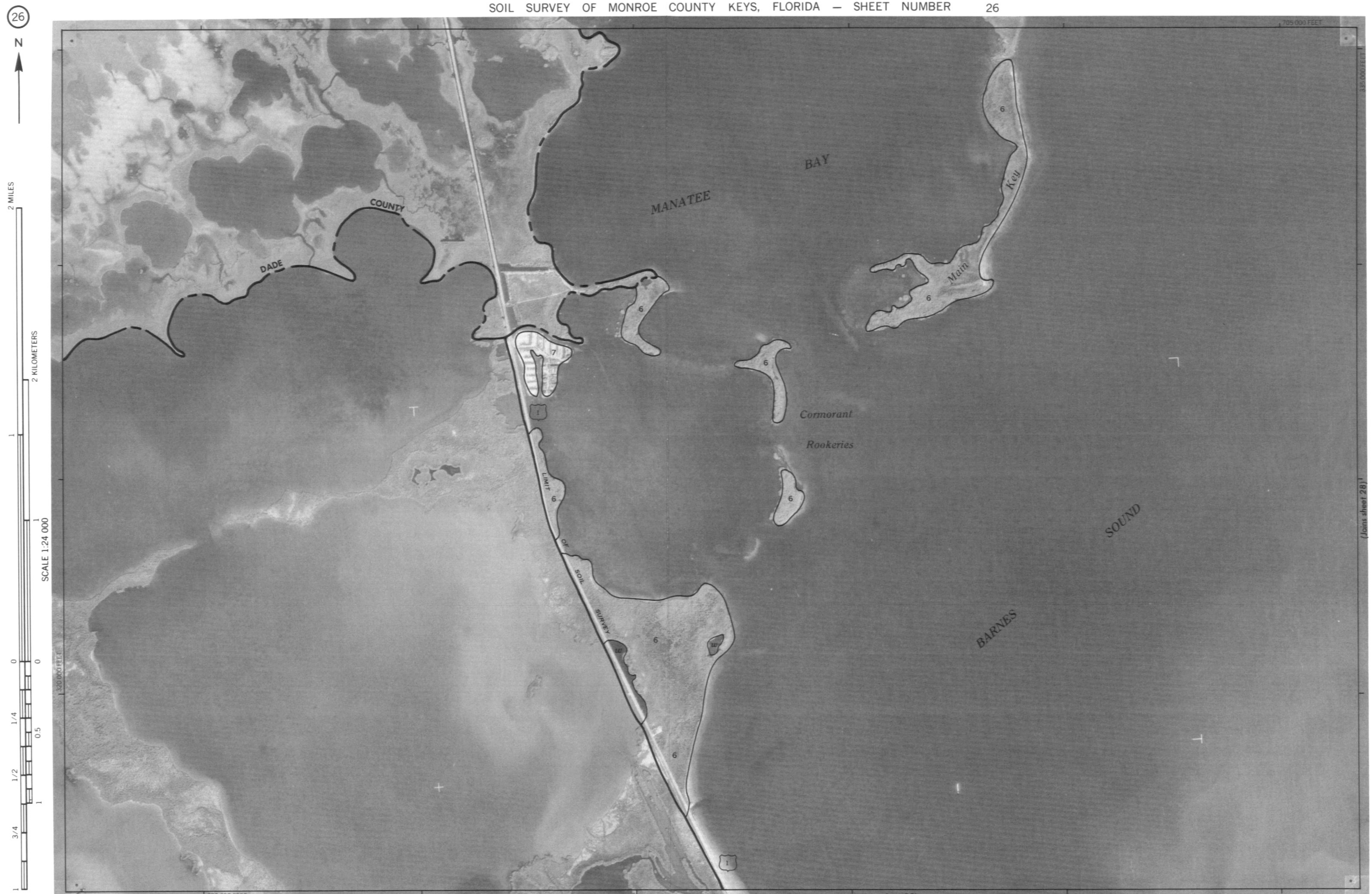
21
N
(Joins sheet 22)
(Joins sheet 20)
FLORIDA
BAY
Cowpens
Anchorage
Plantation
Key
Cotton Key
Basin
Cotton
Key
Snake
Creek
Windley
Key
Wilson
Key
Whale
Harbor
Channel
Whale
Harbor
Treasure
Harbor
Islamorada
Upper Matecumbe
Key
ATLANTIC
OCEAN
2 MILES
2 KILOMETERS
SCALE 1:24 000
625 000 FEET
650 000 FEET


22
N
FLORIDA
BAY
Pigeon Key
(Joins sheet 22)
(Joins sheet 23)
660 000 FEET
665 000 FEET
(Joins inset, sheet 22)
FLORIDA
BAY
Community Harbor
Key Largo
Tavernier Creek
Tavernier
Plantation Key
Tavernier Key
ATLANTIC
OCEAN
(Joins sheet 21)
640 000 FEET
2 MILES
2 KILOMETERS
SCALE 1:24 000

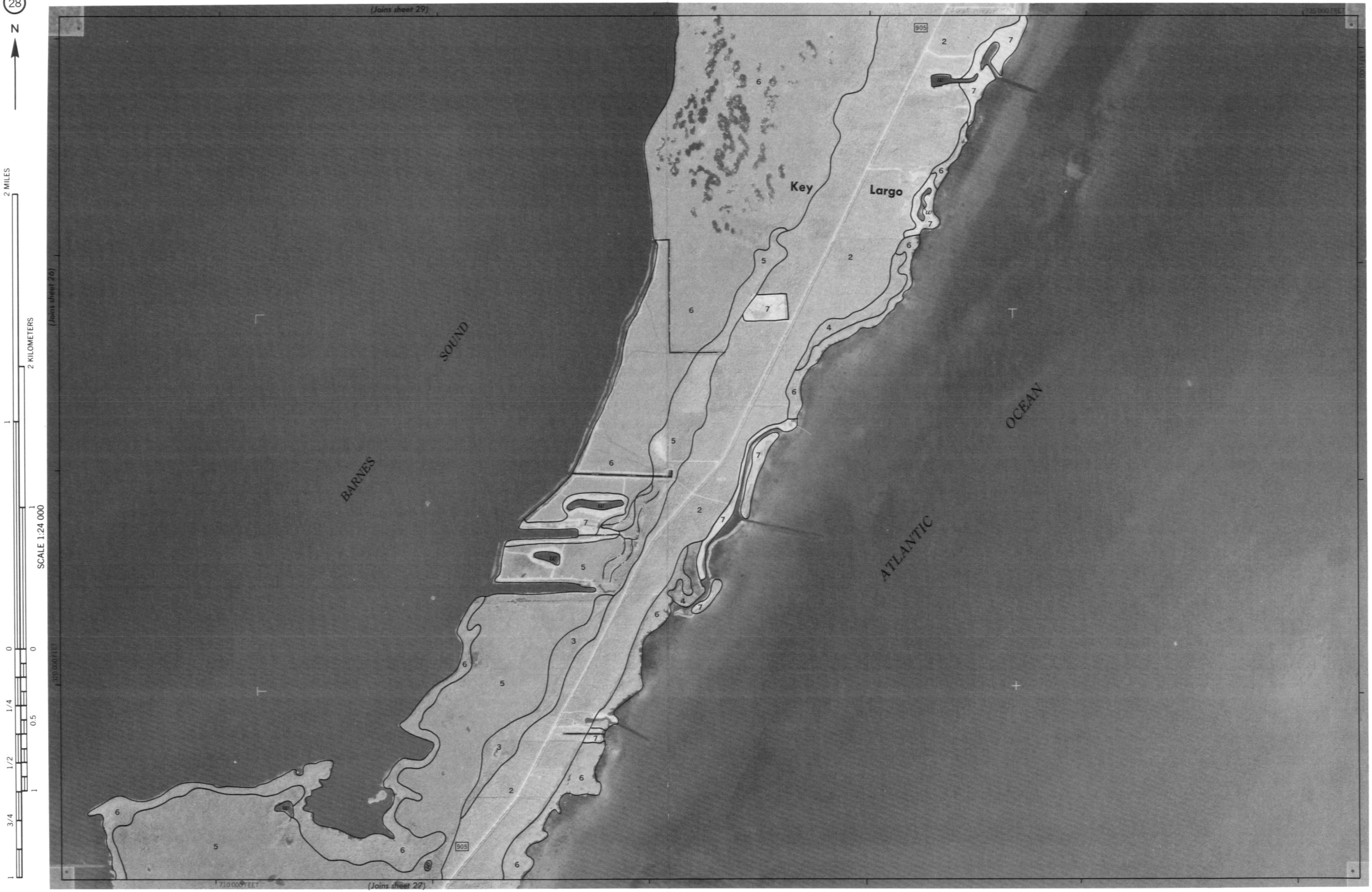

23
N
(Joins sheet 24)
670 000 FEET
275 000 FEET
695 000 FEET
260 000 FEET
(Joins inset, sheet 22)
(Joins inset, sheet 23)
Pelican Key
Sunset Cove
water
Largo
Key
FLORIDA
BAY
OCEAN
ATLANTIC
Rodriguez
Key
Dove
Key
(Joins sheet 23)
(Joins sheet 22)
OCEAN
ATLANTIC
670 000 FEET
3000 AND 5000-FOOT GRID TICKS
2 MILES
2 KILOMETERS
SCALE 1:24 000
1
1
1/4
1/2
3/4
0
0
0.5
1

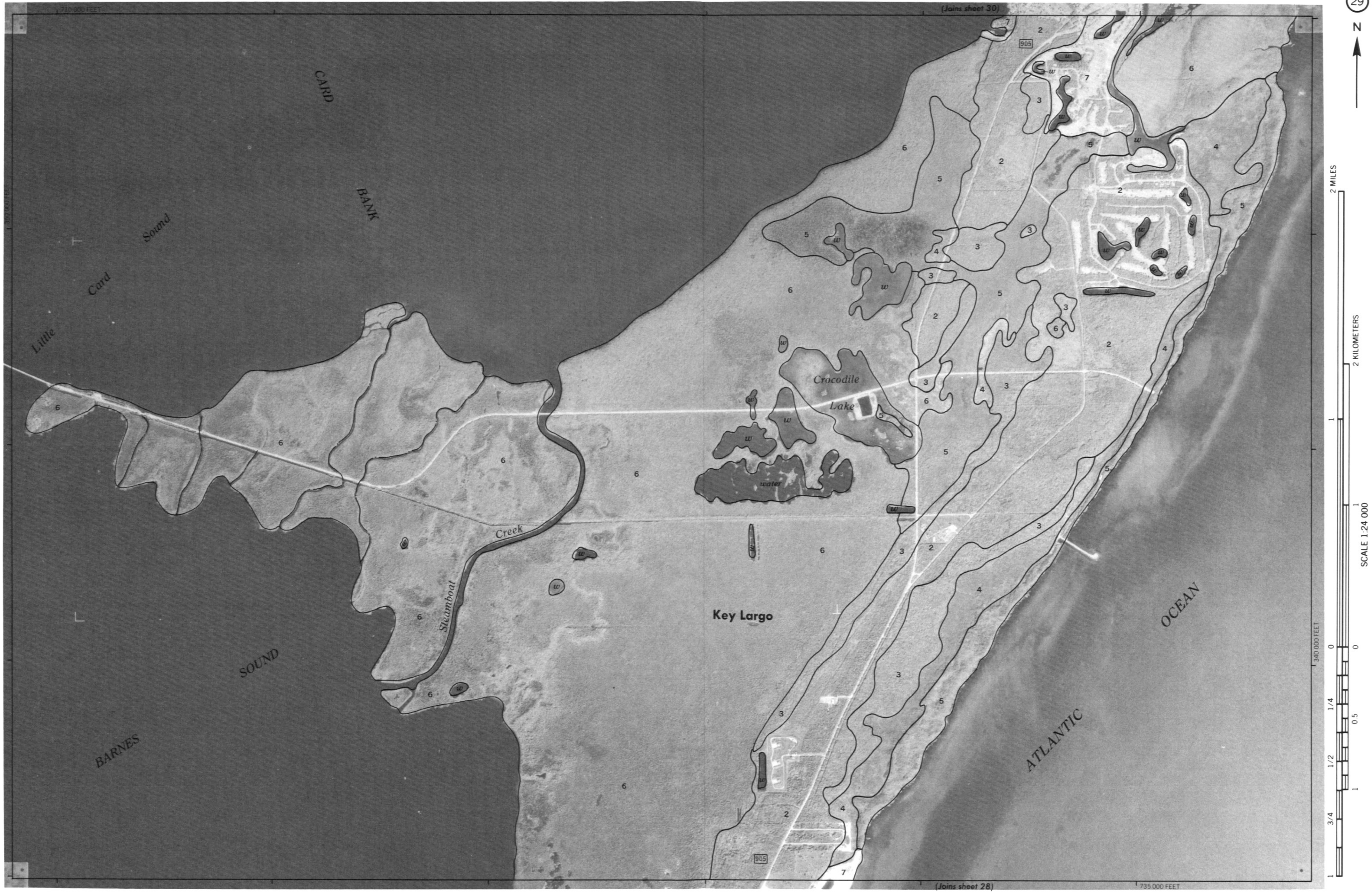

N
2 MILES
2 KILOMETERS
SCALE 1:24 000
BLACKWATER
SOUND
LIMIT OF SOIL SURVEY
TARPON
BASIN
BUTTONWOOD
SOUND
LARGO
SOUND
Key Largo
El Radabob Key
South Sound Creek
ATLANTIC
OCEAN
(Joins sheet 23)

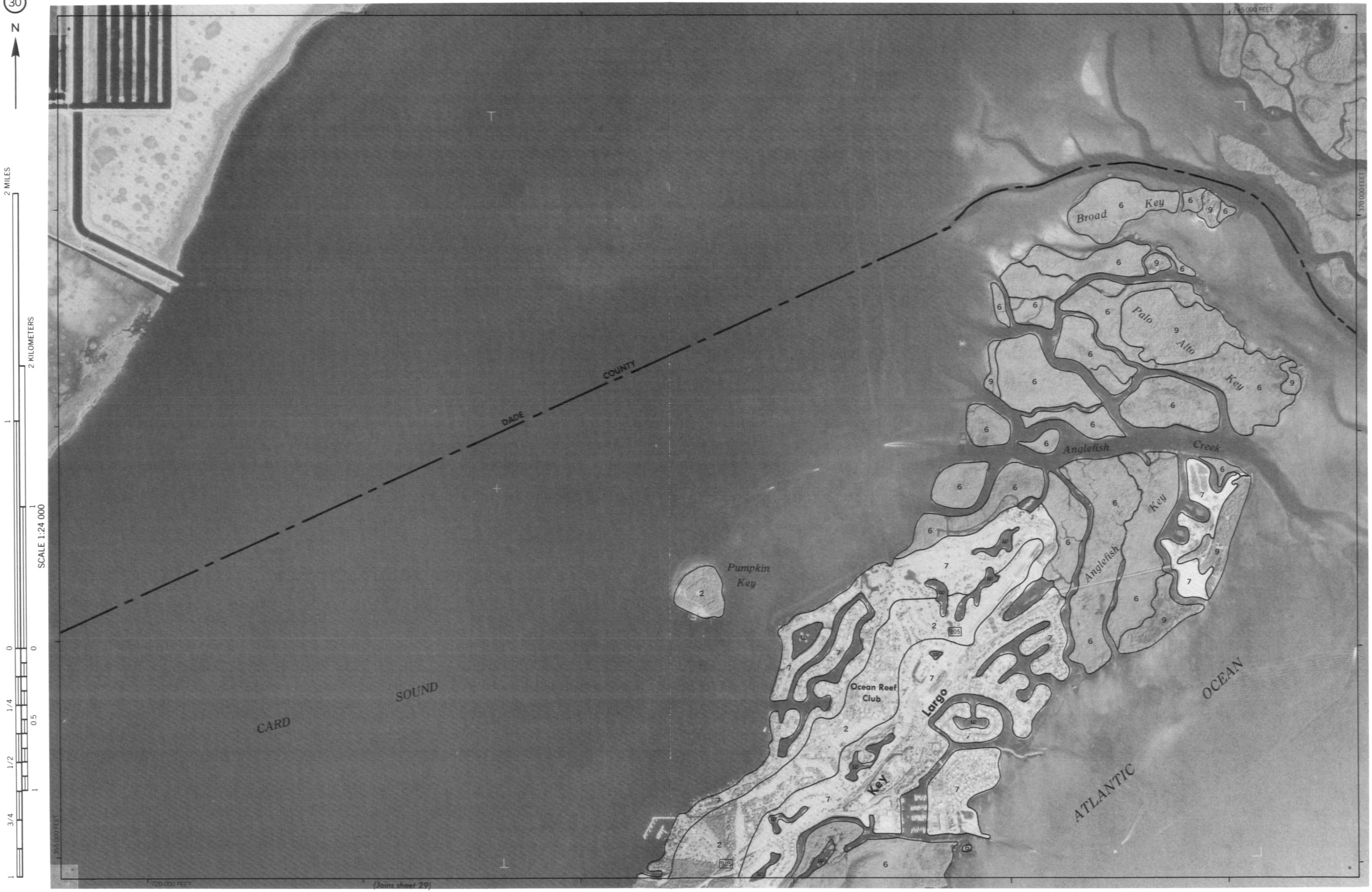

25
N
(Joins sheet 26)
(Joins sheet 27)
(Joins sheet 24)
680 000 FEET
315 000 FEET
BARNES SOUND
Lake Suprise
Sexton Cove
LIMIT OF SOIL SURVEY
BLACKWATER SOUND
Key Largo
2 MILES
2 KILOMETERS
SCALE 1:24 000


26
N
DADE
COUNTY
MANATEE
BAY
Main
Key
Cormorant
Rookeries
BARNES
SOUND
LIMIT
OF
SOIL
SURVEY
6
7
(Joins sheet 28)
(Joins sheet 25)
680 000 FEET
705 000 FEET
320 000 FEET
335 000 FEET
SCALE 1:24 000
2 MILES
2 KILOMETERS
1
1/4
1/2
3/4
0
0.5


27
N
710 000 FEET
(Joins sheet 28)
(Joins sheet 25)
water
Lake Simmons
Lake Suprise
Key Largo
905
1
Garden Cove
Rattlesnake Key
Creek
Sound
Key
North
El Radabob
Whitmore Bight
ATLANTIC
OCEAN
300 000 FEET
735 000 FEET
2 MILES
2 KILOMETERS
SCALE 1:24 000
0
1/4
1/2
3/4
1
0.5


(Joins sheet 29)
(Joins sheet 26)
(Joins sheet 27)
N
2 MILES
2 KILOMETERS
SCALE 1:24 000
Key
Largo
BARNES
SOUND
ATLANTIC
OCEAN
905
710 000 FEET
735 000 FEET


29
N
(Joins sheet 30)
(Joins sheet 28)
710 000 FEET
735 000 FEET
340 000 FEET
CARD BANK
Little Card Sound
BARNES SOUND
Crocodile Lake
Steamboat Creek
Key Largo
water
905
ATLANTIC OCEAN
2 MILES
2 KILOMETERS
SCALE 1:24 000
0
1/4
1/2
3/4
1
0.5


N
2 MILES
2 KILOMETERS
SCALE 1:24 000
745 000 FEET
370 000 FEET
720 000 FEET
DADE
COUNTY
Broad Key
Palo Alto Key
Anglefish Creek
Anglefish Key
Pumpkin Key
Ocean Reef Club
Key Largo
905
CARD SOUND
ATLANTIC OCEAN
(Joins sheet 29)